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MAY

MODERN MECHANIX

HOBBIES AND INVENTIONS

NSC

A FAWCETT PUBLICATION

15c

MECHANIZING the MOUNTIES

NEW BOAT PLANS
SEE PAGE 79

MAY 1937

MODERN MECHANIX HOBBIES AND INVENTIONS

15 CENTS

40-50-60 MILES AN HOUR! THEY ALMOST HAD THEIR MEN WHEN ... *BANG!* A BLOW-OUT!

S. S. VAN DINE
Celebrated author of popular mystery thrillers and creator of "Philo Vance"

Read S. S. Van Dine's breath-taking description of Sergeant McCabe's* thrilling man hunt

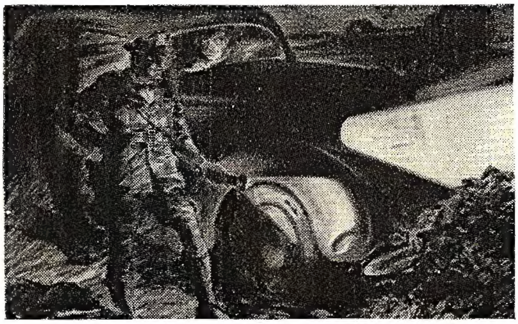
"THERE they are! Not more'n a quarter mile ahead of us. We'll overhaul 'em before they reach the Bad Lands." Sergeant McCabe's voice was excited and triumphant.

And just then a sharp explosion rent the air, and the police car leaped from the narrow road and lurched crazily to a sudden stop in a rock-strewn sandy field.

"A blow-out!" snarled the driver. In the distance the faint tail-light of the criminals' car could be discerned, rapidly disappearing into the now unbroken blackness.

"No chance now," the Sergeant complained sullenly. "They've escaped."

The criminals did escape that time. But, thanks to the persistence of Sergeant McCabe and his men, they were later captured.

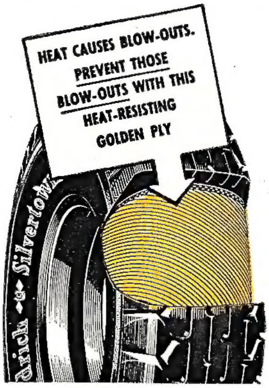


**Names and localities are fictitious, but the episode is suggested by an actual occurrence.*

It's bad enough to have a man-hunt frustrated by a bursting tire. Think of how terrible it must be, though, to have an innocent, carefree motorist start off on a pleasure trip only to have a blow-out catapult his car crazily into anything that blocks the way.

The solution to all this havoc on the highways has seemed to me to depend on the manufacture of a *safer* tire. That's why the invention of the Life-Saver Golden Ply by Goodrich should be the "Good News" to every American Motorist that it was to me. As one of the Goodrich engineers explained, "This Golden Ply, which is now found in every Silvertown Tire, is a layer of special rubber and full-floating cords, scientifically treated to resist the terrific blowout-causing heat generated inside *all* tires by today's high speeds. By resisting this heat, the Golden Ply provides motorists with *real* protection against high-speed blow-outs."

No wonder thousands of motorists are changing to Silvertowns. Silvertowns *below* mean *safety above.* Remember, you can purchase these at Goodrich Silvertown Stores and Goodrich dealers everywhere.


HEAT CAUSES BLOW-OUTS. PREVENT THOSE BLOW-OUTS WITH THIS HEAT-RESISTING GOLDEN PLY
Goodrich Silvertown

Goodrich SAFETY Silvertown

With Life-Saver Golden Ply Blow-Out Protection

Be a RADIO and Television EXPERT

Many Radio Experts Make $30, $50, $75 a Week

I WILL TRAIN YOU AT HOME IN SPARE TIME

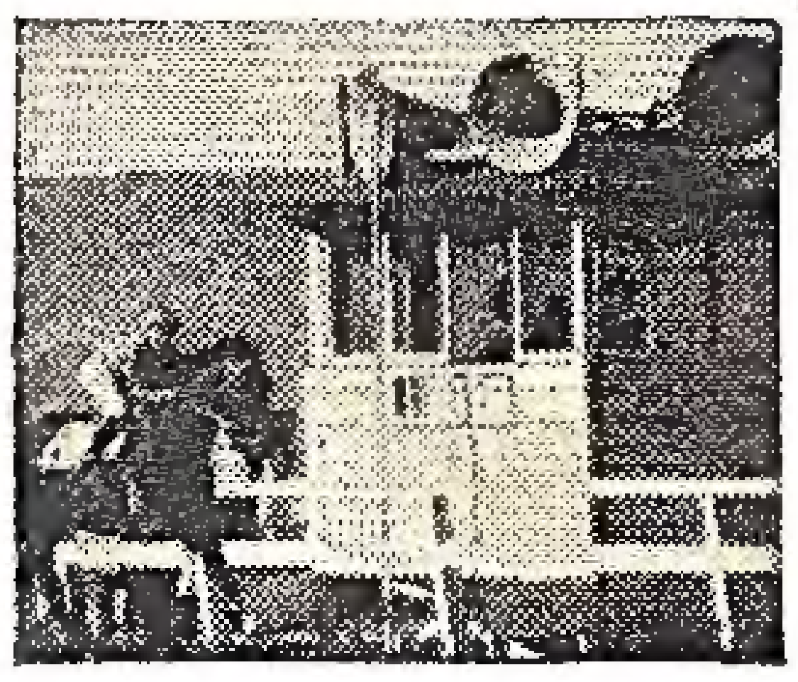
J. E. SMITH, President, National Radio Institute
The man who has directed the home study training of more men for the Radio Industry than any other man in America.

Broadcasting Stations

Employ managers, engineers, operators, installation and maintenance men for fascinating jobs and pay up to $5,000 a year.

Set Servicing

Spare time set servicing pays many $5, $10, $15 a week extra while learning. Full time servicing pays as much as $30, $50, $75 a week.



Loud Speaker Systems

Building, installing, servicing and operating public address systems is another growing field for men well trained in Radio.

HERE'S PROOF
THAT MY TRAINING PAYS

$80 Monthly in Spare Time

"I work on Radio part time, still holding my regular job. Since enrolling five years ago, I have averaged around $80 every month." JOHN B. MORISSETTE, 773 Silver Street, Manchester, N. H.

Makes $50 to $60 a Week

"I am making between $50 and $60 a week after all expenses are paid, and I am getting all the Radio work I can take care of, thanks to N. R. I." H.W. SPANGLER, 908 Walnut St., Knoxville, Tenn.

Operates Public Address System

"I have a position with the Los Angeles Civil Service, operating the Public Address System in the City Hall Council. My salary is $153 a month." R.H.ROOD, R. 136, City Hall, Los Angeles, Calif.

Do you want to make more money? Radio offers you many opportunities to make good money in your spare time while getting ready for a full time job. Mail the coupon below. Find out how you can train at home to be a Radio Expert—and how you can get the training you need to cash in on Television's coming opportunities. You don't have to give up your job, leave home, or spend a lot of money. I will train you at home in your spare time.

Train at Home—Get Ready Now For Jobs Like These

Radio already gives jobs to more than 300,000 people. Radio broadcasting stations employ engineers, operators and station managers and pay up to $5,000 a year. Spare time Radio set servicing pays as much as $200 to $500 a year—full time servicing jobs pay as much as $30, $50, $75 a week. Many Radio Experts own their own full time or part time Radio businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, service men, paying up to $6,000 a year. Radio operators on ships get good pay and see the world. Automobile, police, aviation, commercial Radio and loud speaker systems offer good opportunities to well-trained Radio men. Men I have trained at home make good money in all these branches of Radio.

Television Will Offer Many Good Jobs to Well Trained Men

In the past fifteen years, Radio has grown from an experimenter's plaything to one of the country's great industries. And Television today is as advanced as Radio was 15 years ago. Already millions of dollars have been spent developing Television equipment. Television receivers have been built which produce images equal to home moving pictures. About twenty experimental Television stations have already been licensed. N. R. I. not only gives you the training you need to make good money in Radio now, but in addition, gives you Television training which will help you cash in on the profitable opportunities coming with Television.

Many Make $5, $10, $15 a Week Extra in Spare Time While Learning

But you do not have to wait until Television arrives to cash in on my Training. You do not even need to wait until you have finished my Training in Radio and Television. Radio offers many good-pay opportunities NOW! Every neighborhood needs a good spare time serviceman. The day you enroll I start sending you Extra Money Job Sheets. They show you how to do Radio repair jobs that you can cash in on quickly. Throughout your Training I send plans and ideas that have made good spare time money for hundreds of fellows.

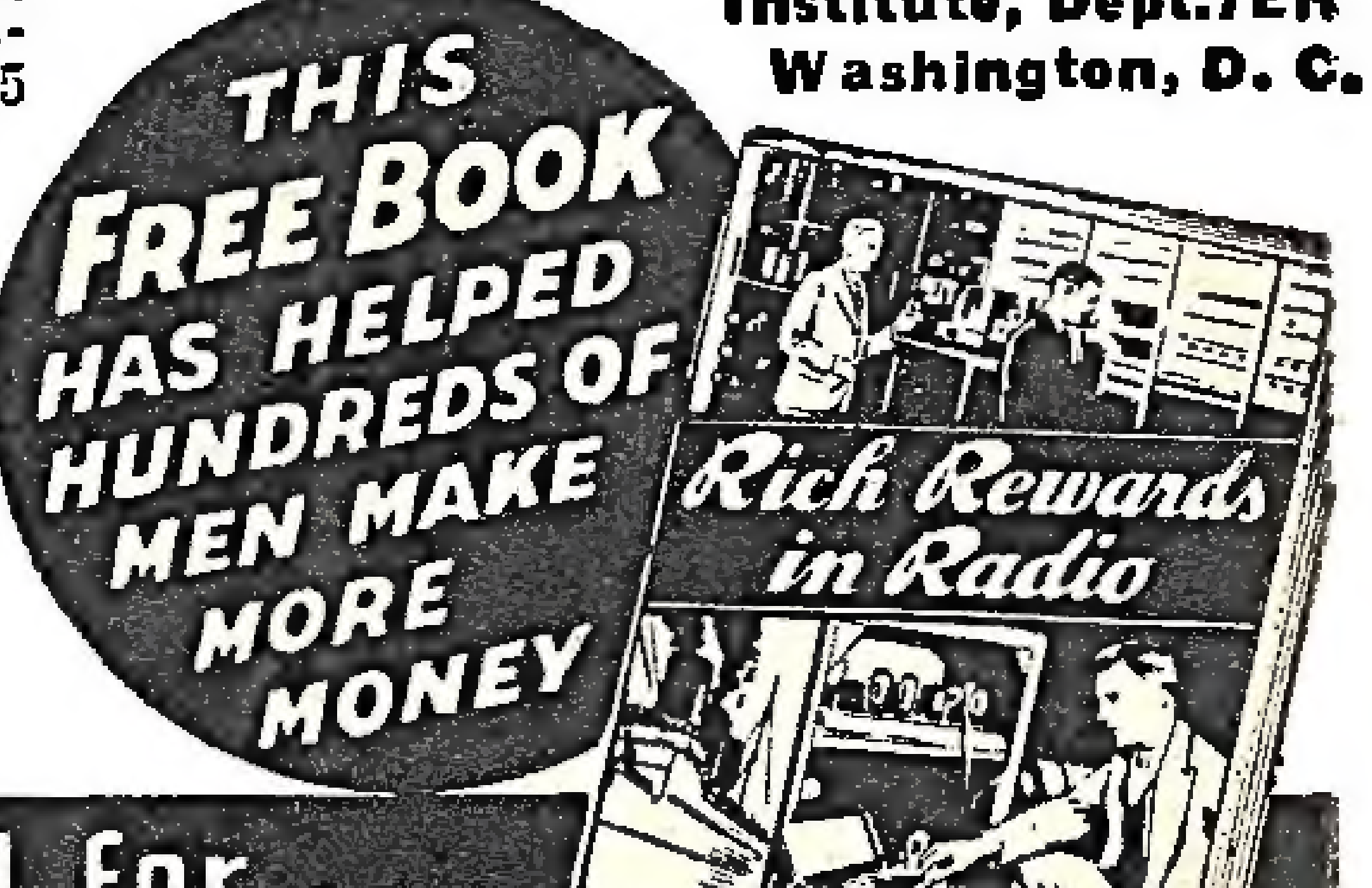
My Money Back Agreement Protects You

I am so sure I can train you successfully that I agree in writing to refund every penny you pay me if you are not satisfied with my Lessons and Instruction Service when you finish. I'll send you a copy of this agreement with my Free Book. Special Radio Equipment which I supply gives you practical experience—I show you how to conduct experiments and build circuits which illustrate important Radio principles.

Find Out What Radio and Television Offer You

Act today. Mail the Coupon now for my 64 page book, "Rich Rewards in Radio." It's sent free to any fellow over 16 years old. It describes Radio's spare time and full time opportunities and those coming in Television; tells about my Training in Radio and Television; shows you actual letters from men I have trained telling what they are doing and earning. Find out what Radio offers YOU! MAIL THE COUPON in an envelope, or paste it on a penny postcard—NOW!

J. E. SMITH, Pres., National Radio Institute, Dept.7EH Washington, D. C.


THIS FREE BOOK HAS HELPED HUNDREDS OF MEN MAKE MORE MONEY
Rich Rewards in Radio

This Coupon is Good For . . . One FREE Copy of My Book

J. E. SMITH, President, Dept. 7EH
National Radio Institute, Washington, D. C.

Dear Mr. Smith: Without obligating me, please send "Rich Rewards in Radio" which points out the many spare time and full time opportunities in Radio, and those coming in Television—explains how you train men at home in their spare time for Radio and Television. (Please write plainly.)

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ADDRESS ______________________________

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MODERN MECHANIX

MAY
1937

Volume XVIII
Number 1

Circulation over 250,000

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NEXT MONTH

Succumbing to the lure of the open road thousands of new enthusiasts have purchased or constructed trailers in which to live the carefree life of a modern nomad. Of unquestionable value to trailerites will be the authoritative and timely article titled "Housekeeping In A Trailer," appearing in our June issue. Written by Esther Hall, noted authority on the subject, the article details the household equipment that should be carried on trips to insure maximum comfort while using a minimum of the necessarily limited trailer space for storage purposes.

FOR WORKSHOP FANS

Among the many interesting projects included in the June issue will be—the first installment of Building the Arlen Special, a midget dirt track racer; a 5-meter Portable Short-Wave Transmitter; How To Build Playground Equipment; Hammered Aluminum Ware Projects; Garden Furnishing Projects, and other workshop plans, suggestions, and practical kinks.

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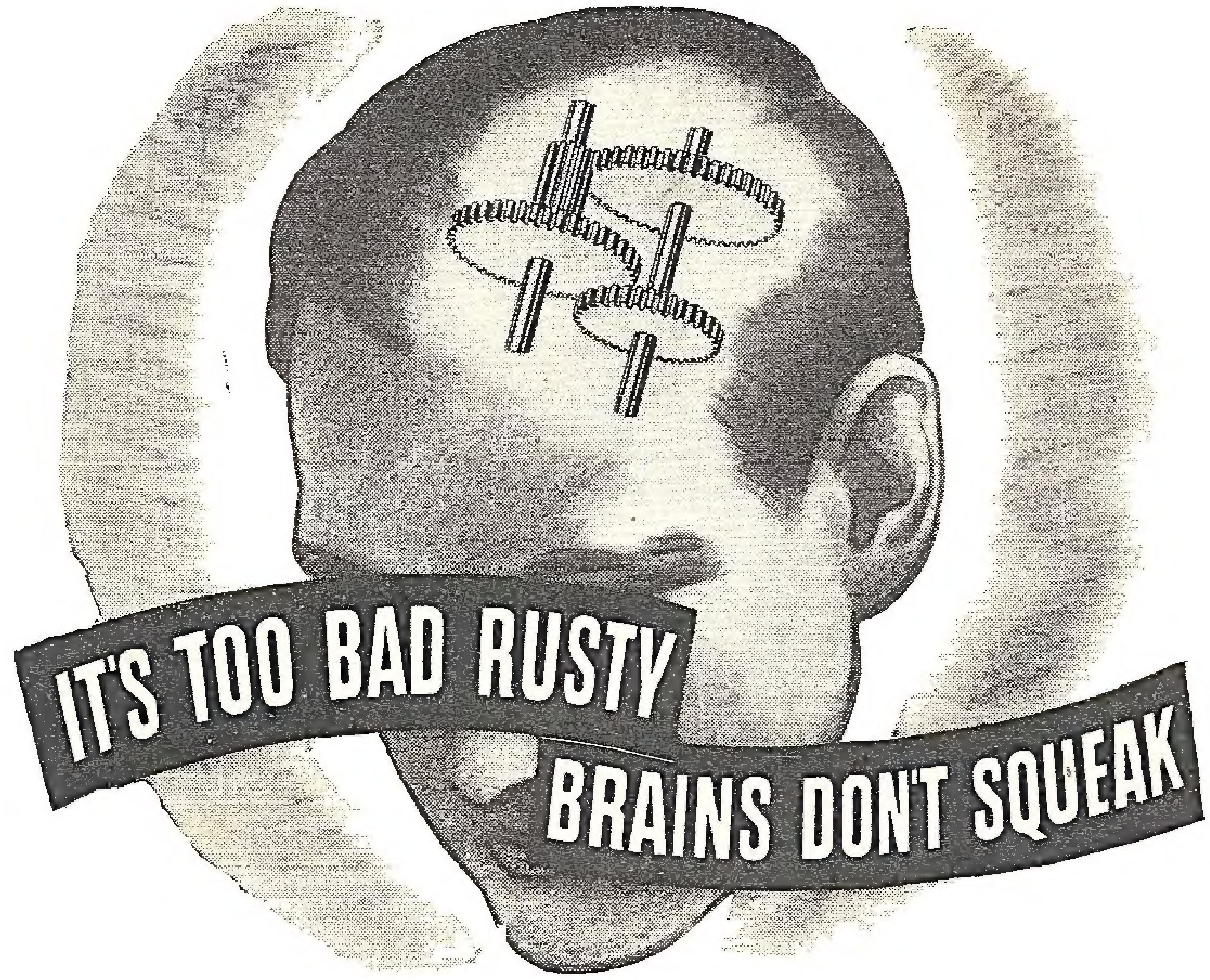

IF RUSTY BRAINS did squeak, no one would have to warn you against trying to get ahead in a modern world with antiquated training! Keeping your brain modern is just as important as keeping plant equipment modern. The best way to keep your brain up to date is to keep your training up to date. The business of modernizing men's training is the business of the International Correspondence Schools. All over the world men testify to the effectiveness of I. C. S. training — and if you are stuck on a job, if your pay envelope is too thin, this coupon can be the first step towards changing the whole course of your life.

Modernize
MAKE MORE MONEY

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If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

A frank man to PATENTS-INVENTIONS

THE world of invention moves on. About a hundred years ago people were saying, "There's nothing left to invent"—today we know that is one of the funniest things ever said. Just think what has happened in the last hundred years! Autos, radios, airplanes, and thousands of useful, practical devices for home, shop and office have been invented and put on the market. Inventors are constantly making the world a better place to live in. Did you see a notice in the paper that an obscure worker, Hans Wach, has invented a simple device to utilize exhaust steam on steam boats. *Already, the report states, the steam ship lines have saved more than $15,000 in fuel bills with his invention.* Almost in the same breath the Dept. of Commerce announces that it will soon test out a new non-crashable aeroplane, which the average man can learn to fly in a day, which will travel at 110 miles an hour and sell at the price of a cheap automobile. An unknown Seattle man has invented a robot to go 5,000 feet under the sea and recover millions and millions of dollars worth of gold lying at the bottom of the ocean since the days of the early Spaniards.

Remember this: For every outstanding big invention there are thousands of small, simple things for use in the home, the office, the factory, on the farm, on every sort of travel conveyance. Little articles like you find on the counters of a 10-cent store, hardware store, drug store, toy and novelty shop.

Many Little Ideas Have Big Commercial Possibilities

A person finds something he's using doesn't work right, or it's clumsy, or costs too much. He gets a happy thought. He improves the old Article. That's contribution to human progress. That's the way that many, many men have reached the goal of financial comfort, independence and even wealth. Most of the things millions of us use didn't come from the brains of engineers and physicists. They came from the mind and maybe the crude home work bench of Mr. Average Man, busily engaged in earning his bread and butter at whatever chance or circumstance has given him to do. The "little" man's opportunity as an inventor was never greater than it is today.

Who Are Inventors?

You'd be amazed at the men we contact in the course of a busy year. Most of them do not consider themselves inventors at all. During their work or leisure they get an idea. They work it out on paper. They get in touch with us about Protection. Did you know that a dentist invented the stock ticker, a school teacher the telephone, a farmer the typewriter, an artist the telegraph? Did you know that the crinkly hair pin—sold by millions now—came about because a husband saw his wife twisting the old-fashioned straight hair pin to make it stay in place? **Poor men who have no thought of invention now will be financially well-fixed in a few years because of a happy thought that the world could use to advantage.**

Can You Answer These Questions?

Ask yourself these questions: How do the Patent Laws protect me? What easy steps can I take, without cost, to put myself in position to support my belief that I am the *first* man to think of *my invention?* Is a Patent worth the cost? Do I need a model? Should I try to sell my invention before I have it Patented? Is there any safe, business-like way to secure financial help? If I do apply for a Patent how shall I reach people who can market my invention? Can I protect and sell an improvement on some invention that has already been patented? These are but a few of the questions which usually confront the average man. You need the answers! **YOU CAN HAVE THEM, without cost, trouble, or delay.**

Our Business Is To Help You. Write Us Today

For more than thirty-six years, this firm has been helping men with an inventive turn of mind. We maintain a large staff of trained, experienced specialists—**Registered Patent Attorneys, Draftsmen, and Searchers to help our clients secure all the protection to which they are entitled.** Fees are reasonable. Deferred payments frequently arranged. Questions promptly answered. Write us frankly with absolute assurance that what you say will be treated with strictest secrecy. **But FIRST, send for the FREE BOOKS shown on the opposite page.** They are filled with facts, pictures and suggestions. They tell you things about Patents, Inventions and Selling Inventions that we have learned in our long experience. **They may save you time, expense, EVEN LATER DISAPPOINTMENT. Simply fill in the coupon. No charge, no obligation. Write us today.**

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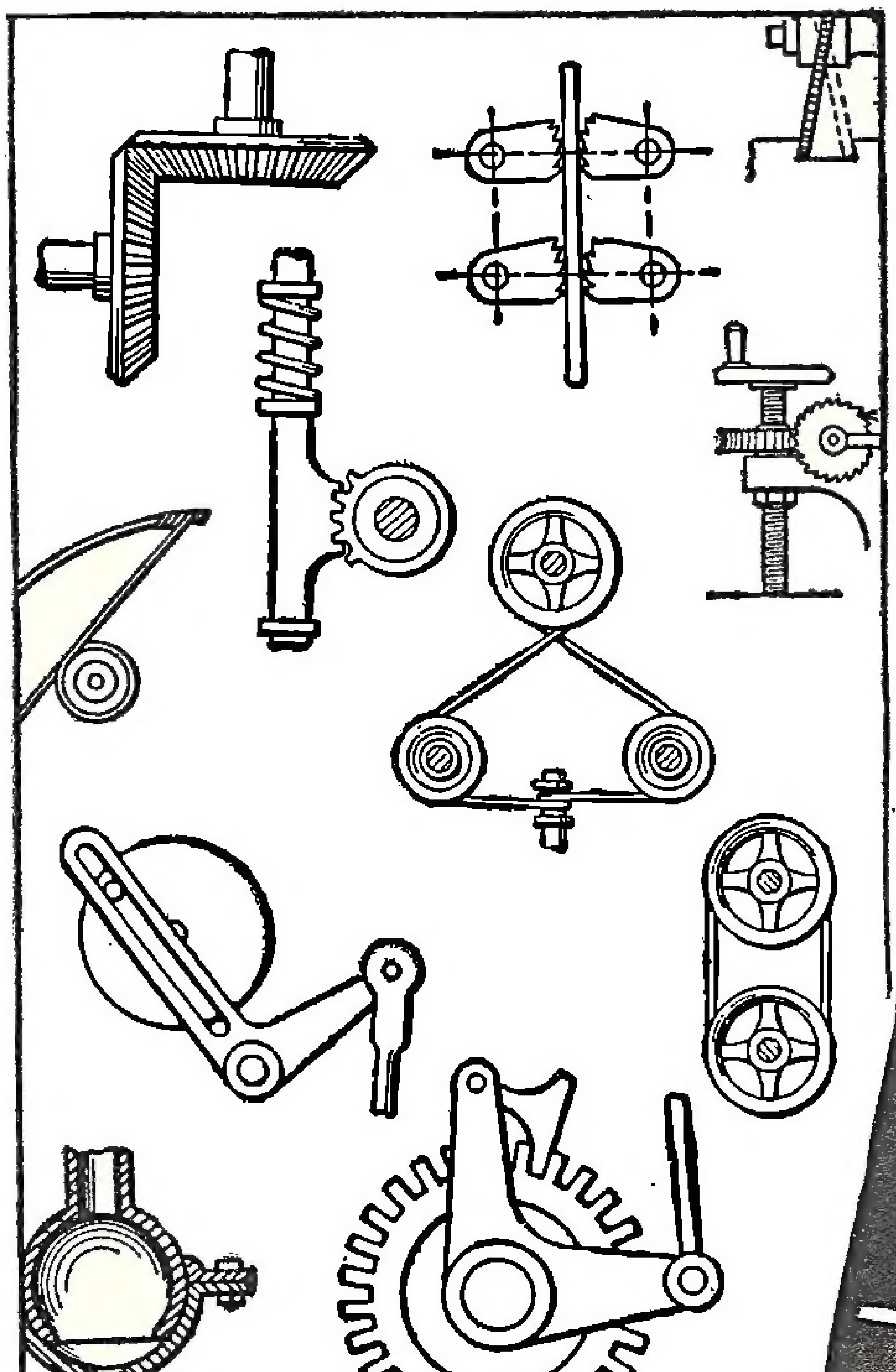

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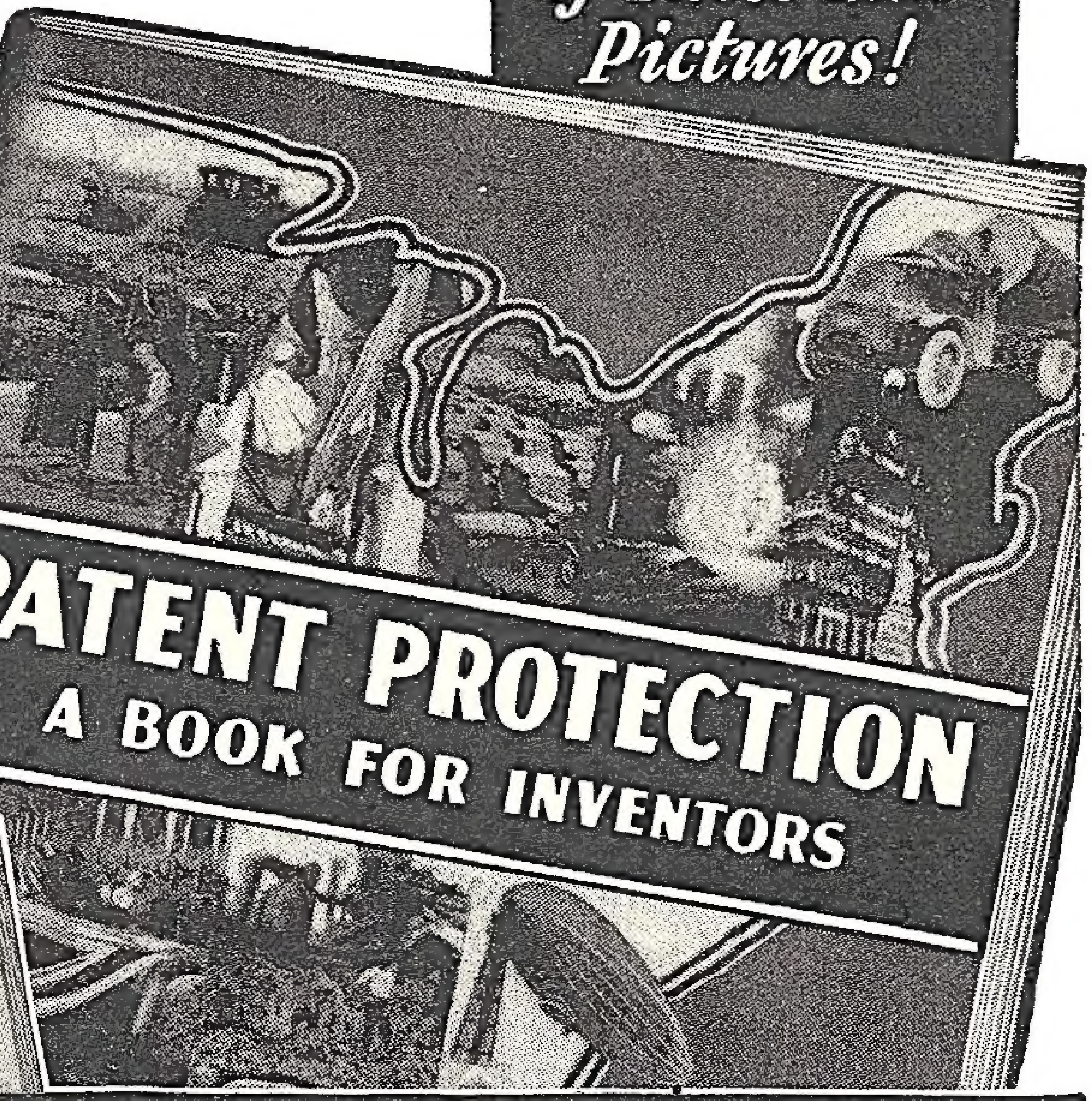

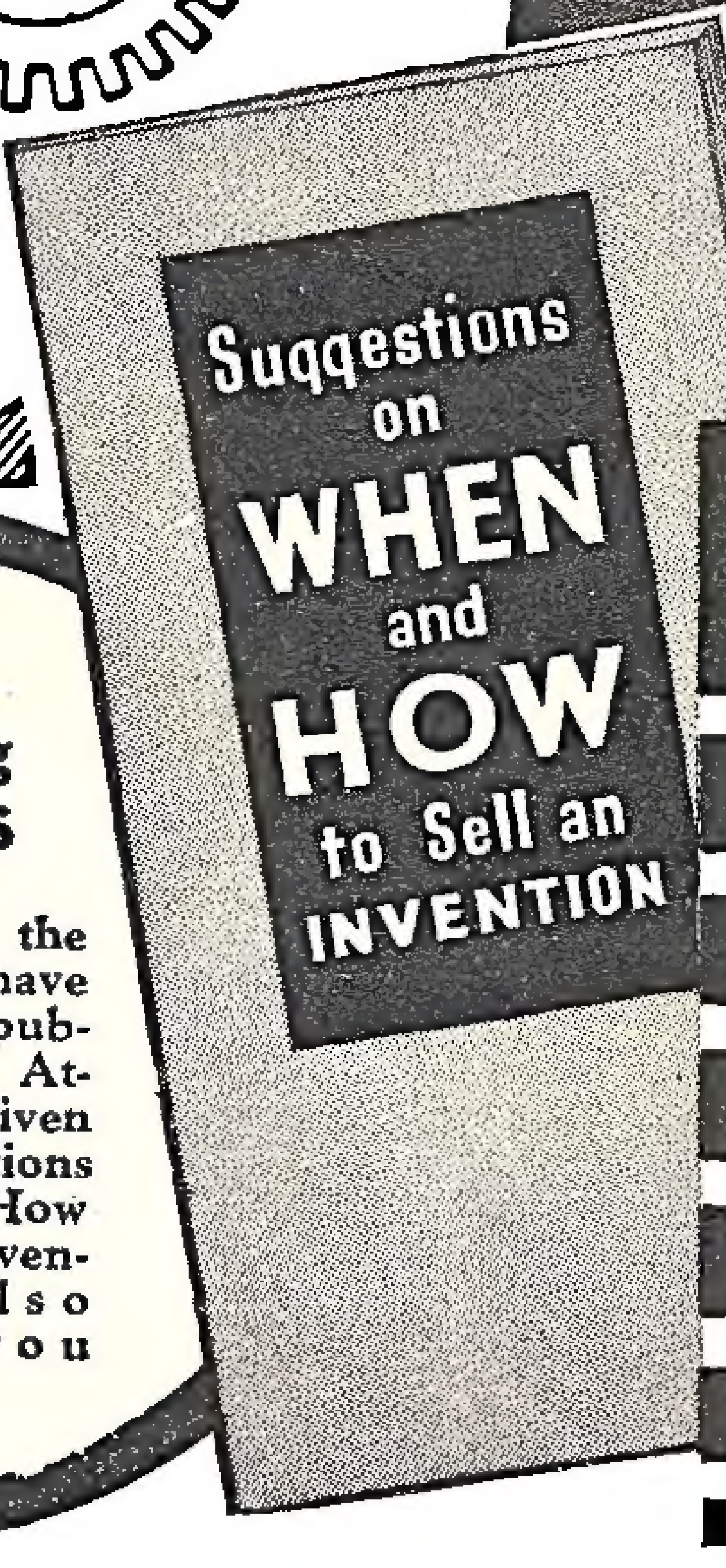
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HOBART PORTABLE ARC WELDER
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Portable Welder with Hobart Generator unit and auto engine or chassis. Lets you operate any place, especially on the profitable outside jobs. Easily saves you $300 to $500.

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New low cost on small sizes as well as large. The most profitable arc welder your shop can own. Welds faster, better, easier, saves current.

Easy to Operate
Hobart Welders have "Simplified" operation. This means faster welding—with the right current for every job. Hobart is simplified, so any of your men can weld easily and successfully. The mystery and uncertainty of obtaining correct welding current settings are removed.

60% Extra Capacity
Over old style 25 Volt Welders—necessary for welding with the new coated rods. Automatic reactance lets you handle light welding work without losing the arc. Users don't understand how they got along with the old style welders after using this new Hobart.

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at no extra cost with Hobart. Think of being able to control your welder from any working point. Saves time, temper, and eliminates the need for a helper on overhead or concealed work.

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Extra earnings and savings make it easy for you to own a Hobart without expense to you. You can even rent a new Hobart —and later purchase it without loss of rent. Check Rental Purchase Plan.

GET THIS VALUABLE MANUAL

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Tell me more about—
( ) Building My Own Portable Welder
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Interested in ☐ 30 DAYS' TRIAL ☐ EASY TERMS

HOBART ONE OF THE WORLD'S LARGEST BUILDERS OF ARC WELDERS

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BRONZE FOUNDRY
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Complete Foundry Outfits are available in three sizes and make it possible for you to produce beautiful bronze, silver or aluminum castings in your home workshop. Presents such as book ends, ash trays, dishes, paper weights, letter openers, bottle openers, statuary, etc., can be quickly made by the sand casting process. Existing objects can be used as patterns, and sand moulds made in a few minutes' time. Previous experience unnecessary. Domestic gas supply and 110 volt 60 cycle energy required for operation.

Size	Crucible Capacity	Shipping Wt.	Wt. Casting	Price Complete
351	6 cu. in.	25 lbs.	1½ lbs.	$13.50
352	12 cu. in.	40 lbs.	3 lbs.	19.00
353	24 cu. in.	65 lbs.	6 lbs.	27.50

Above price includes Universal high speed blower. For low speed blower good on 110 volt 60 cycle only, deduct $4.00. Aluminum Casting Alloy 30c per lb. Prices f. o. b. K. C. Check or money order acceptable, express charges C. O. D. Write for circular.

KANSAS CITY SPECIALTIES CO.
P. O. Box 6022 **Kansas City, Mo.**

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TODAY...

Almost Broke!

Yet tomorrow Tom Smith will be on his way toward being a really successful man . . .

SOMEWHERE there is a Tom Smith—that name is as good as any—who is practically flat broke, back on his heels and discouraged today. Perhaps he's in debt. Perhaps, as far as his job is concerned, he's in a rut. Perhaps he's just a victim of these trying times. Yet—he still has vision, imagination. And—ambition. He still believes that he's going *somewhere* . . . somehow, some way, some time. He hasn't given up hope. He still believes in success and opportunity.

Tom Smith will read this advertisement. No—there is a better way of saying it. Tom Smith *will study* this advertisement. He will read it once, then again, then yet again. It will strike a responsive chord somewhere within him. It will stir his dormant ambition, give wings to his imagination, set his vision afire. And he will *act!* As though Hope—as swift and powerful as lightning when it strikes—had suddenly taken possession of him, he will take advantage of the opportunity this advertisement offers him. And then—

Six months from now, his friends will say, "Have you heard about Tom Smith? Yes—just got a new job with an increase in salary." And two years later, the business journals in his field may report, "Thomas Smith Appointed Manager." And five years . . . or ten . . . or fifteen years hence, the sign on his office door may read "Thomas Smith, President."

All because Tom Smith had the vision, the imagination, the ambition, to recognize the significance of this advertisement. Because he had the foresight to see that here was his way to opportunity.

* * *

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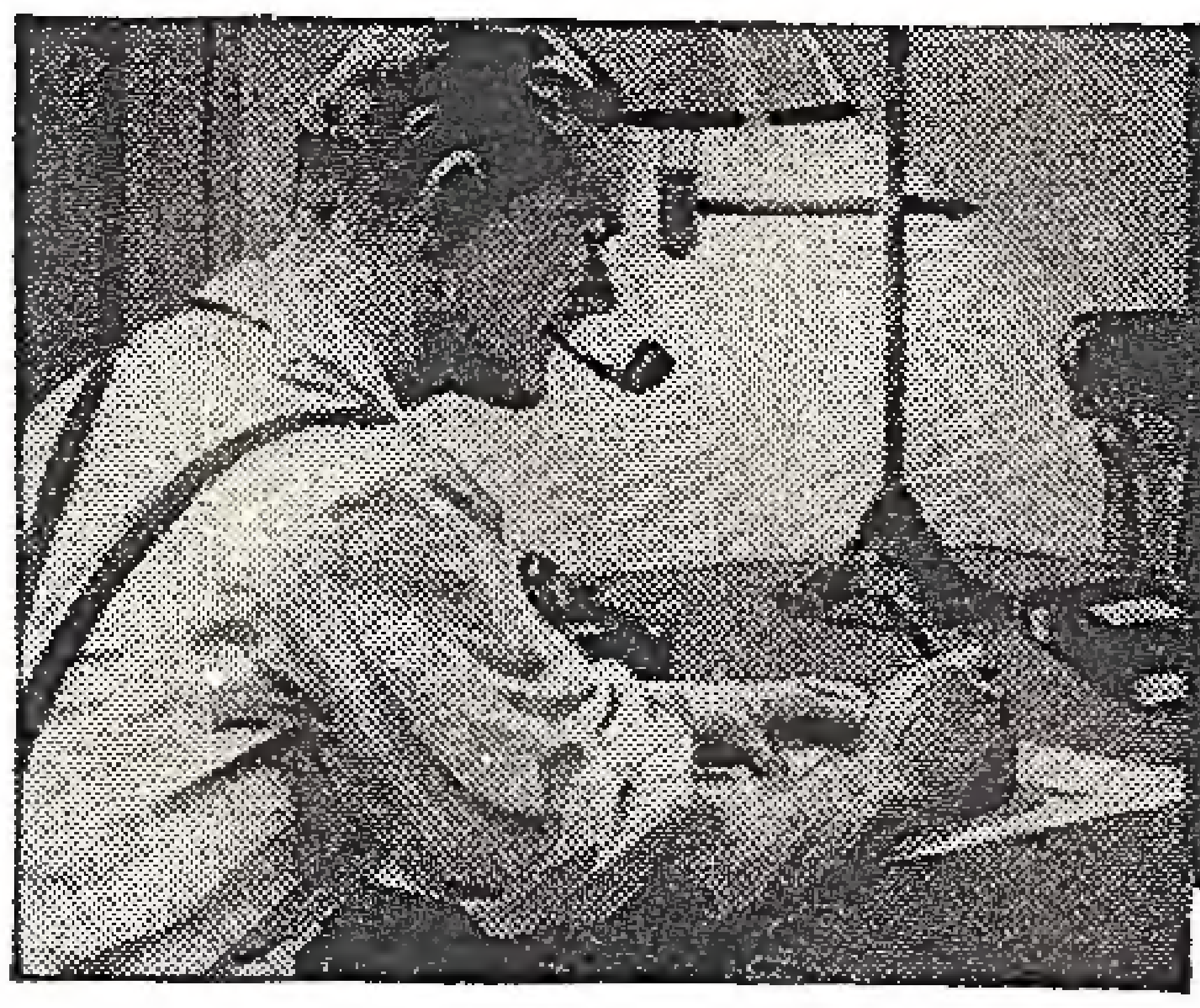

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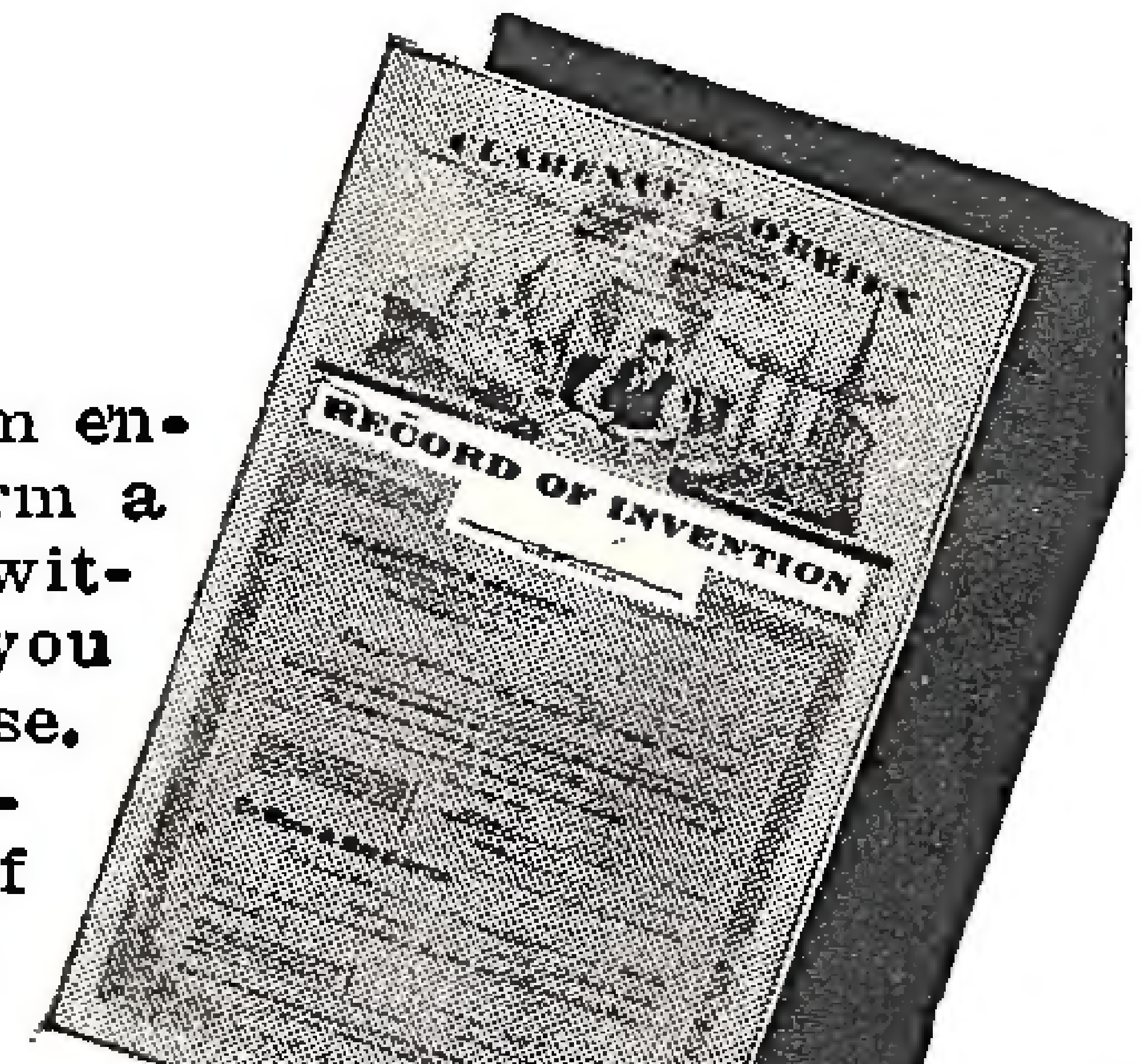

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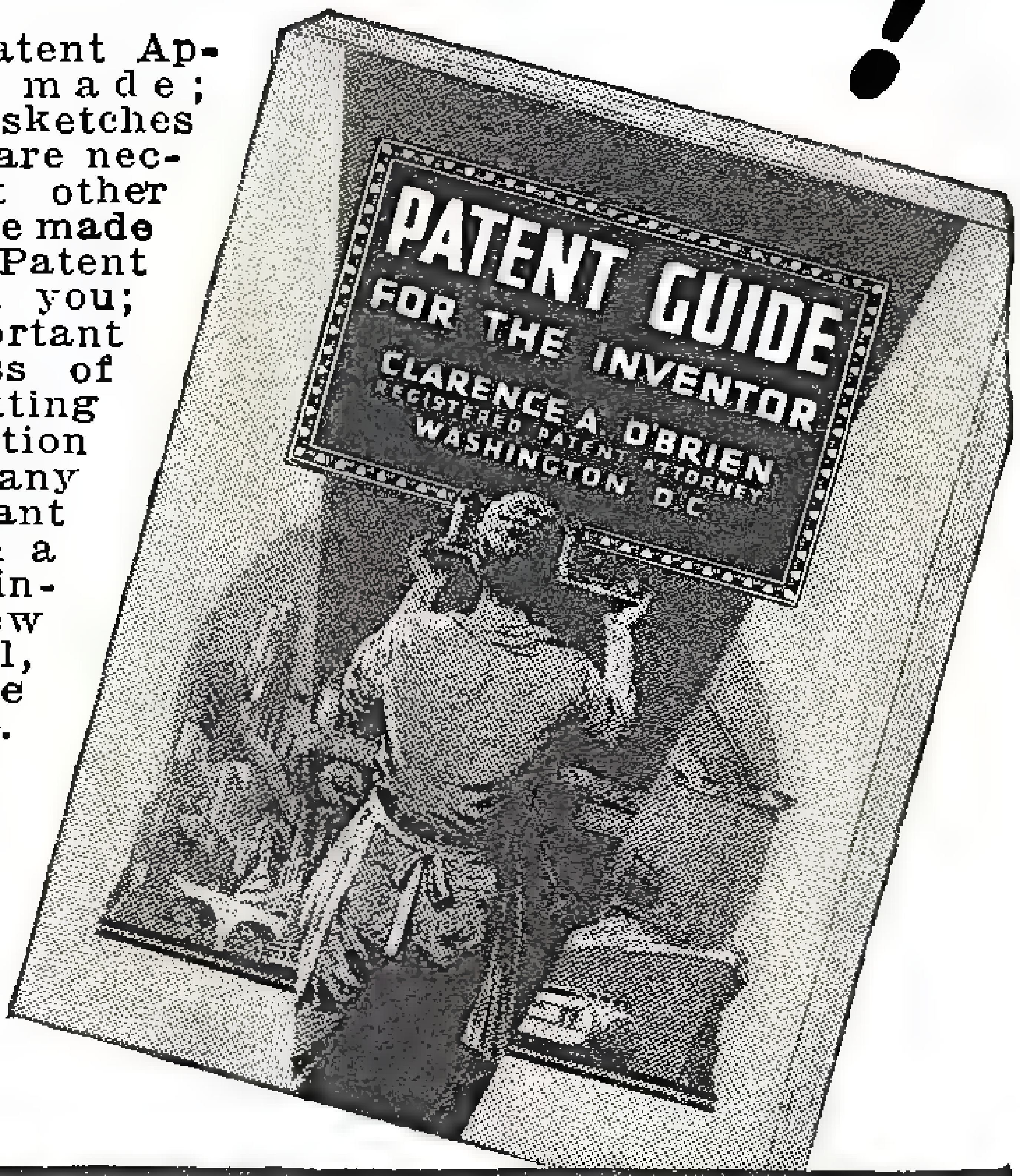

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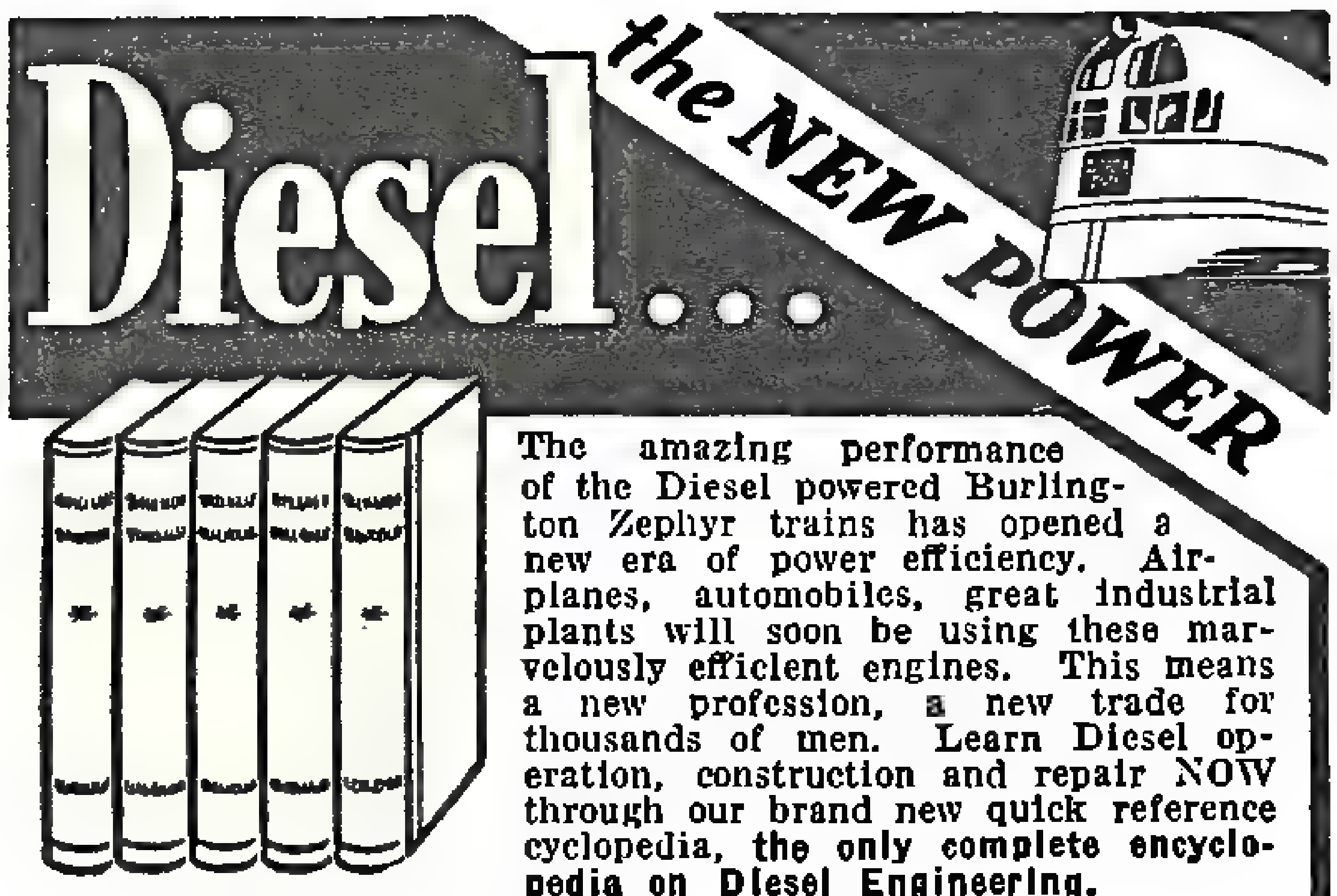

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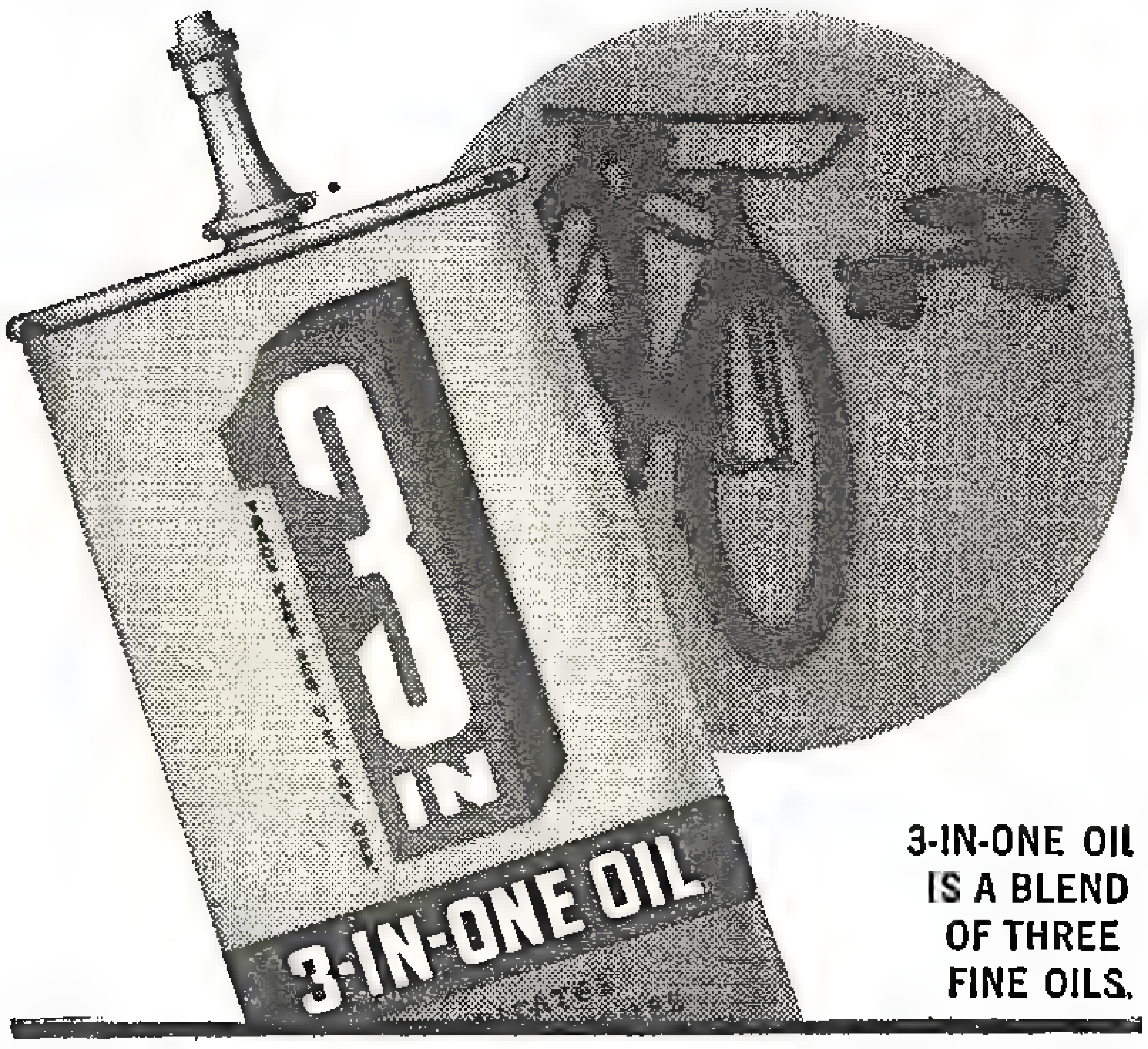

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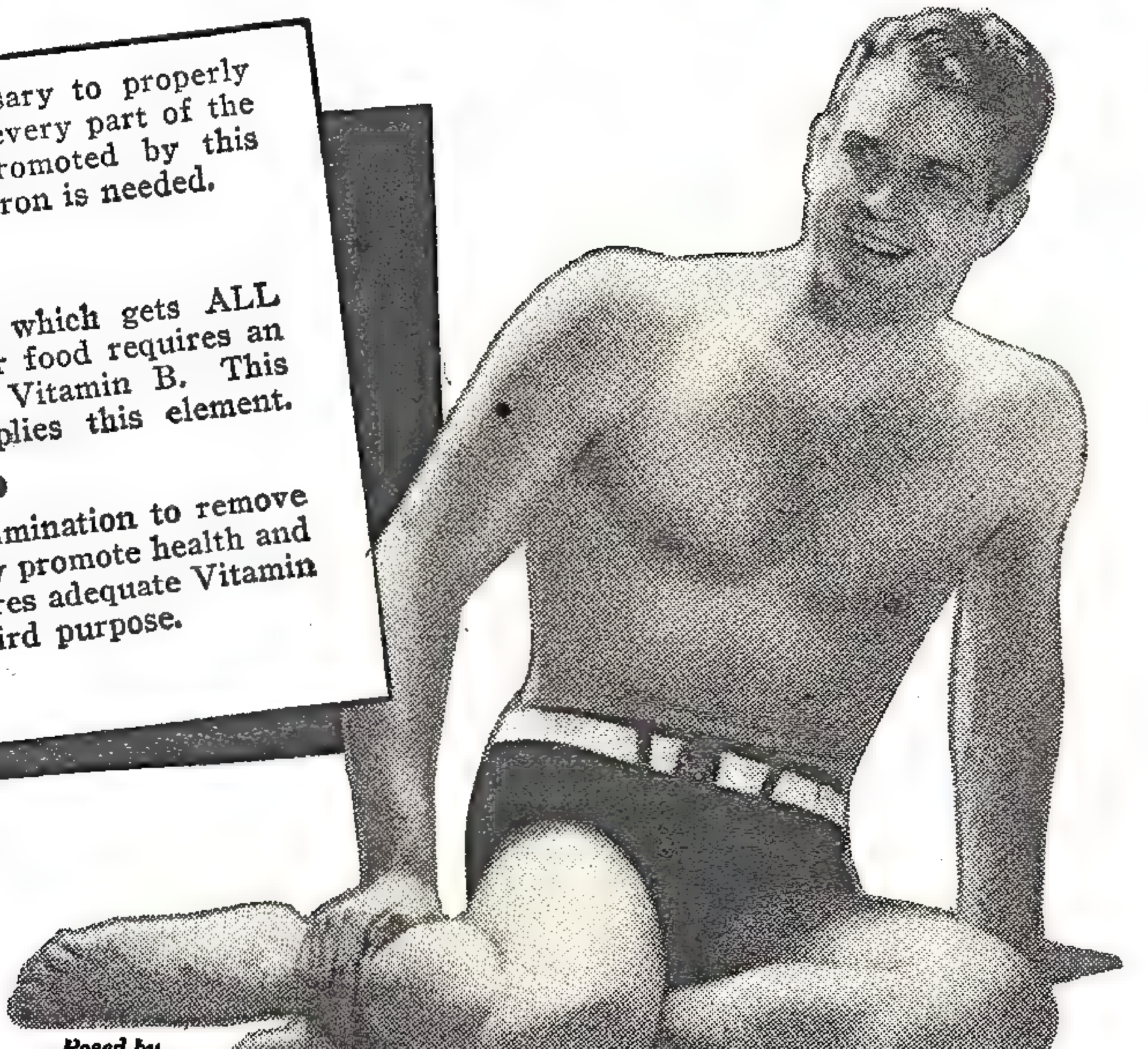

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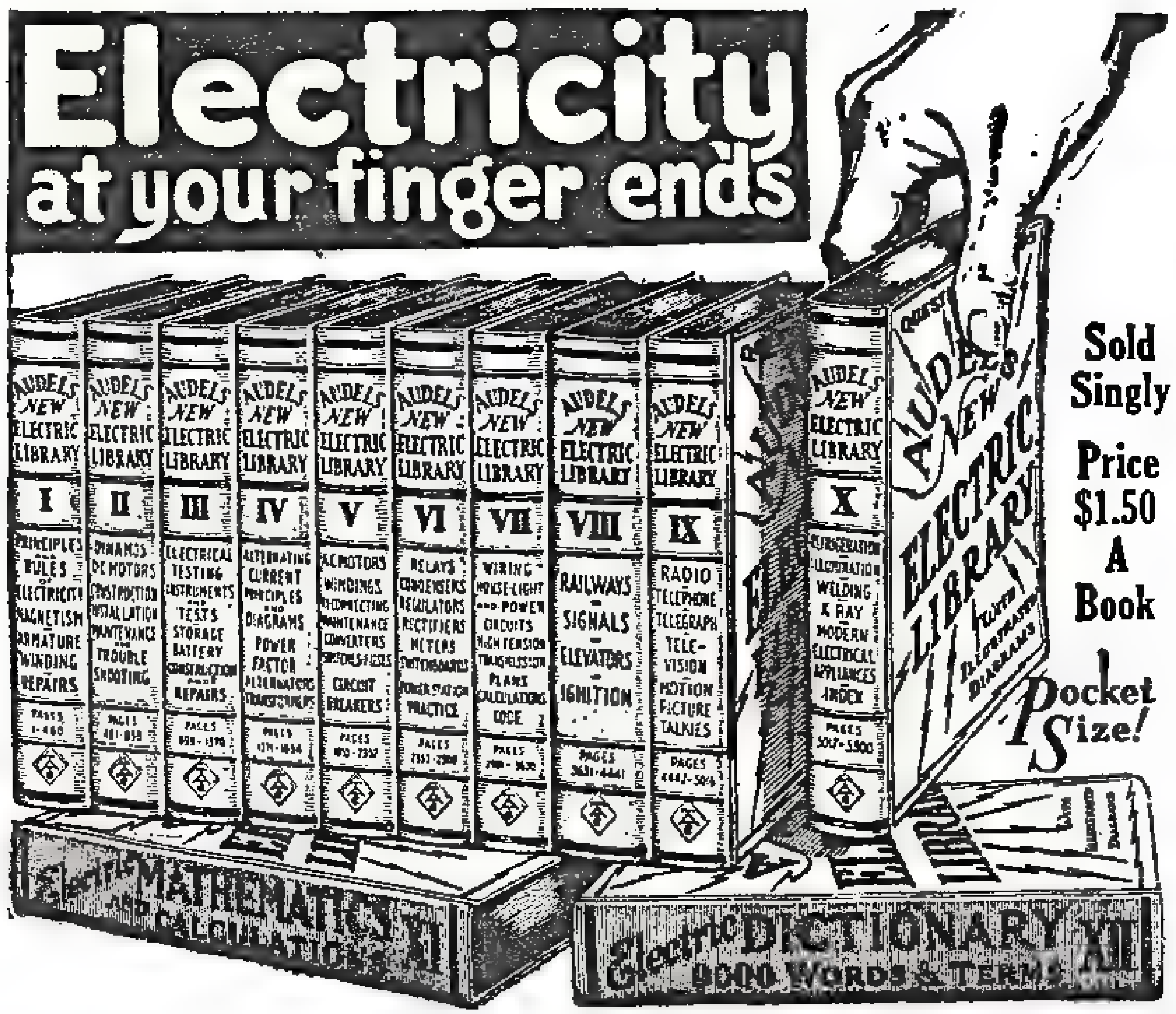
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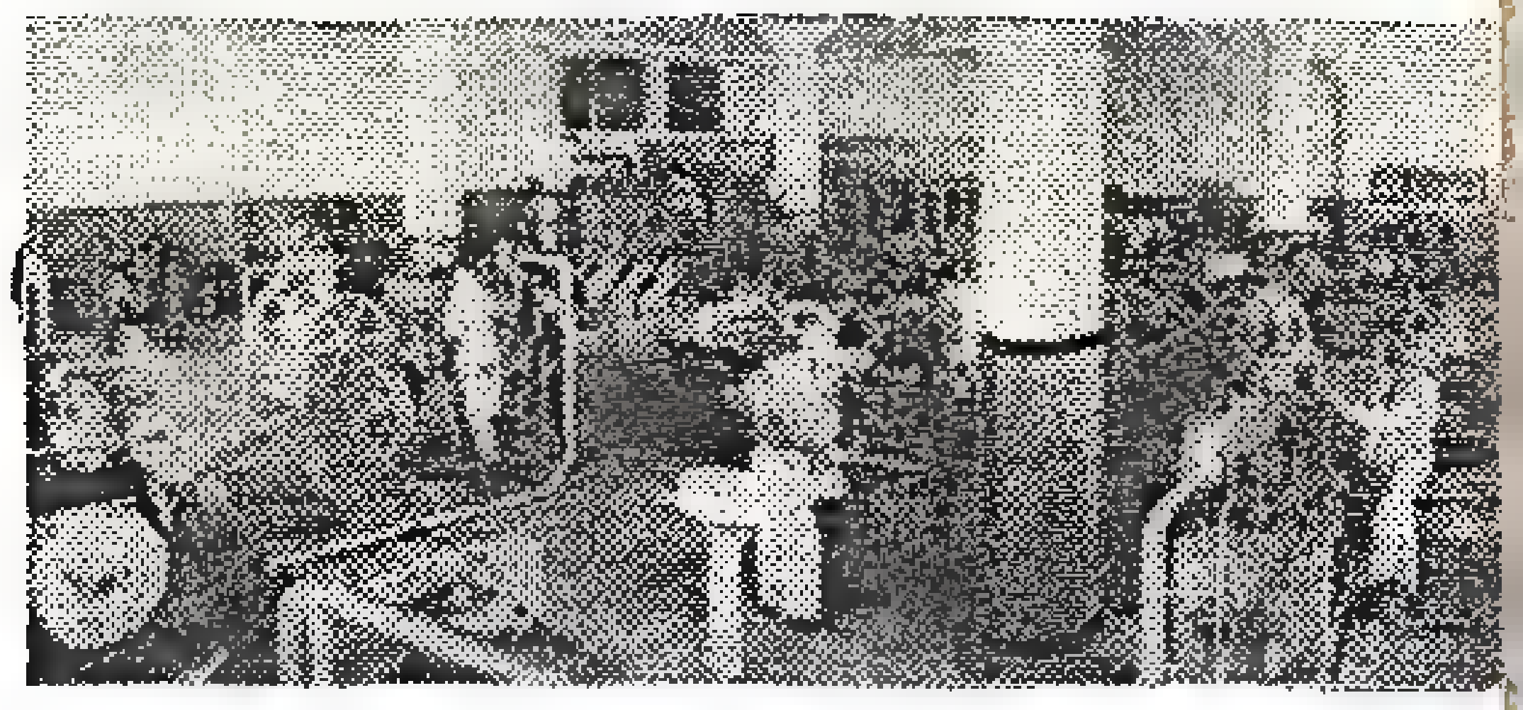
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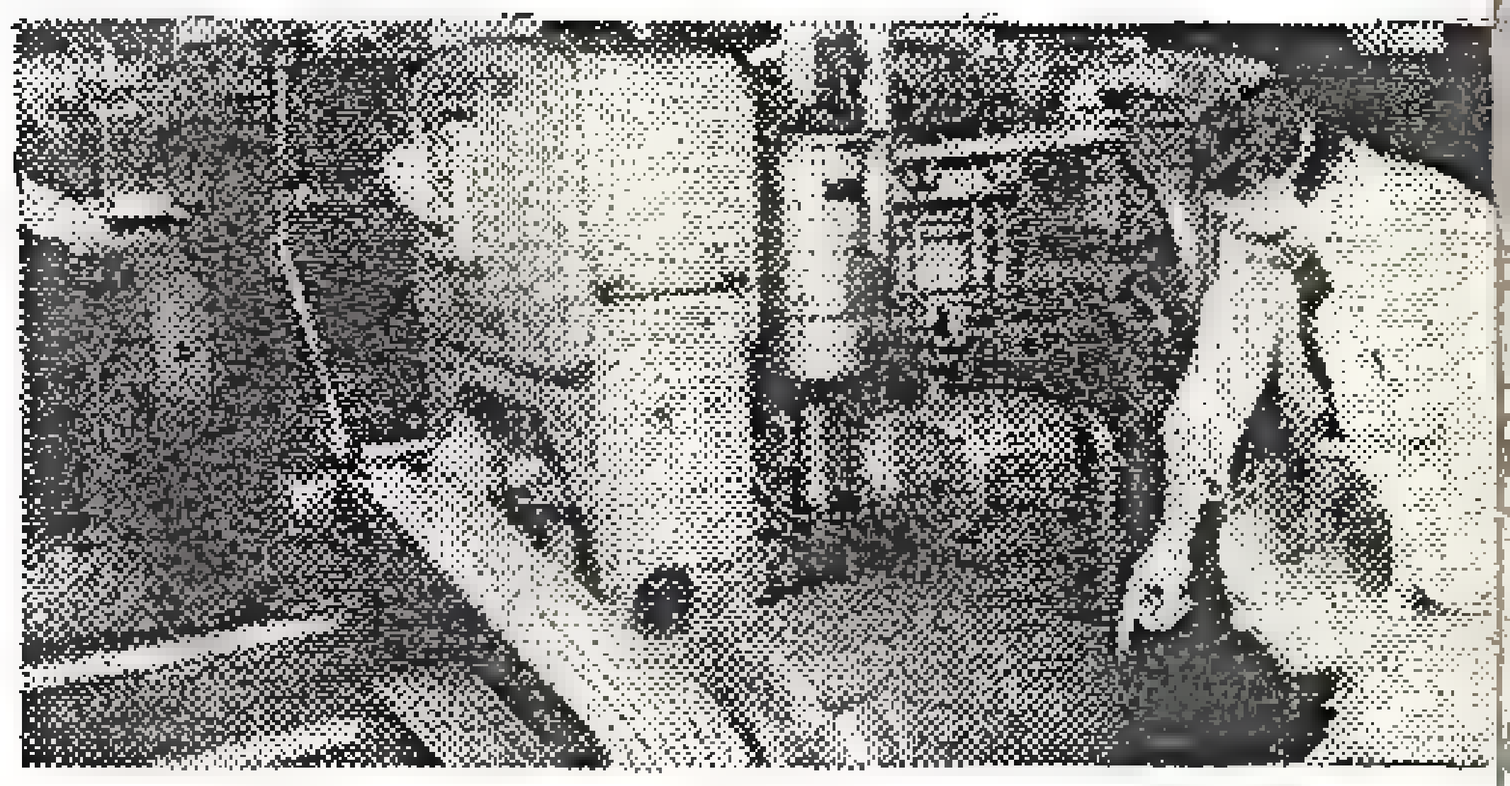
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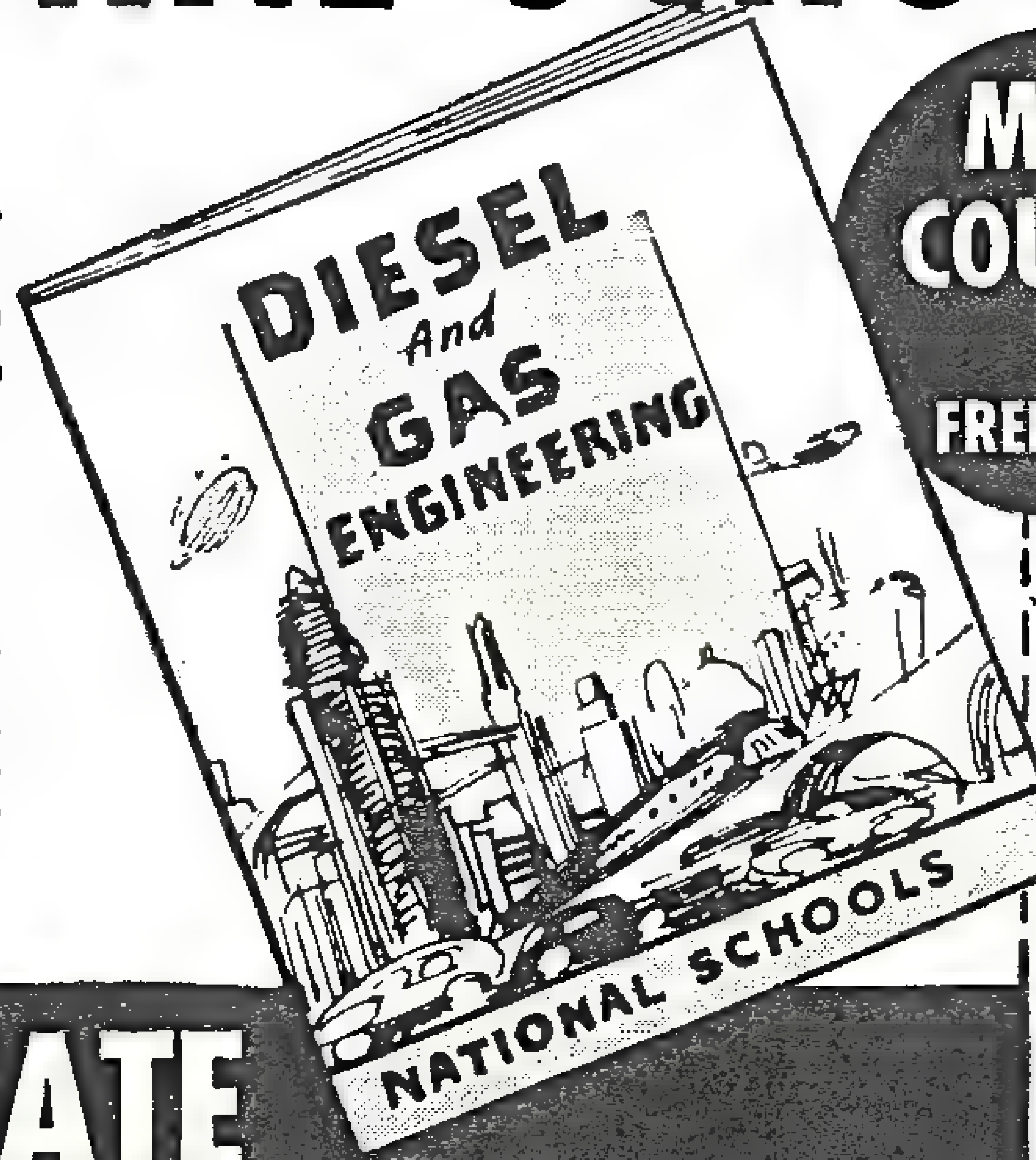

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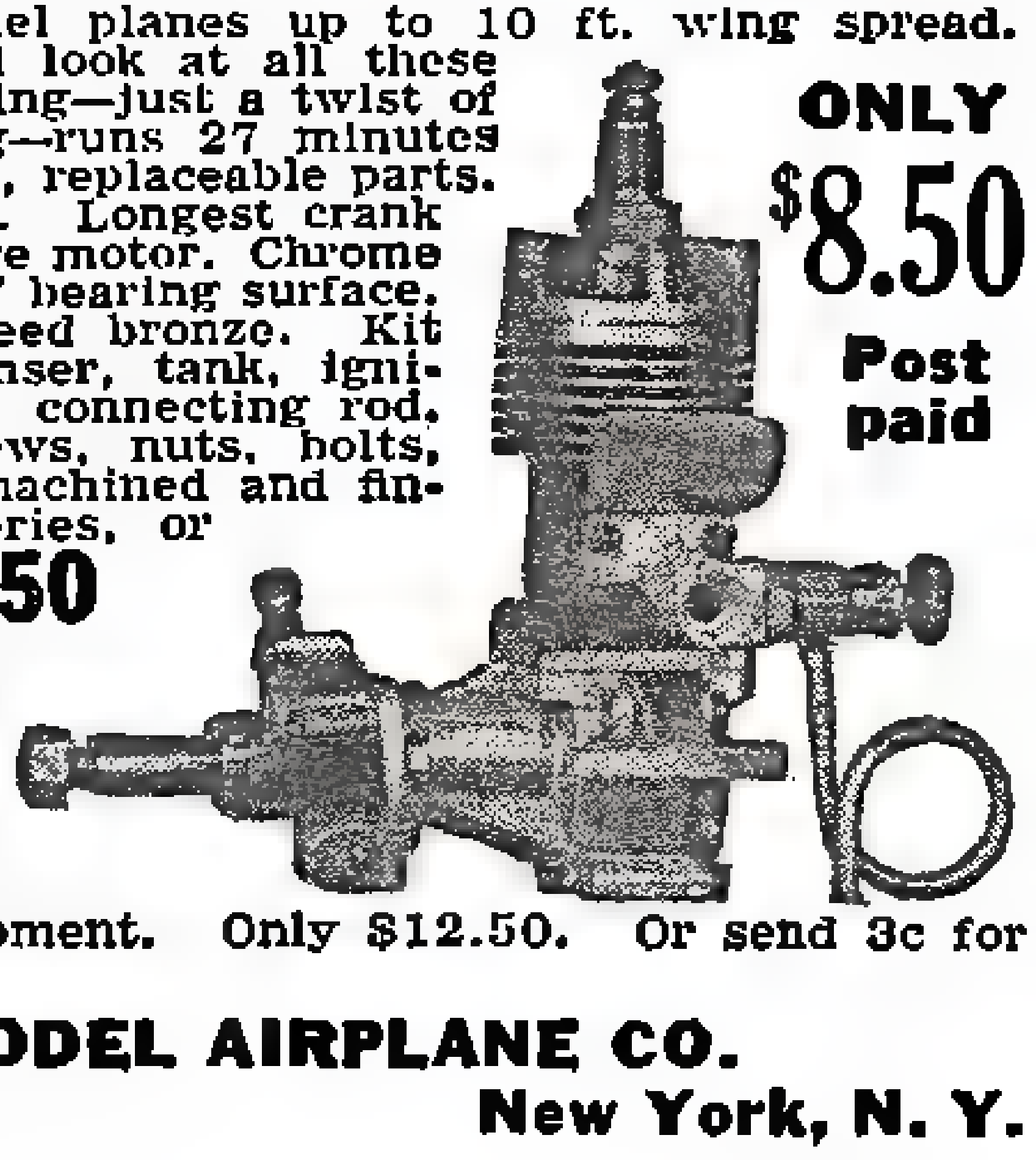

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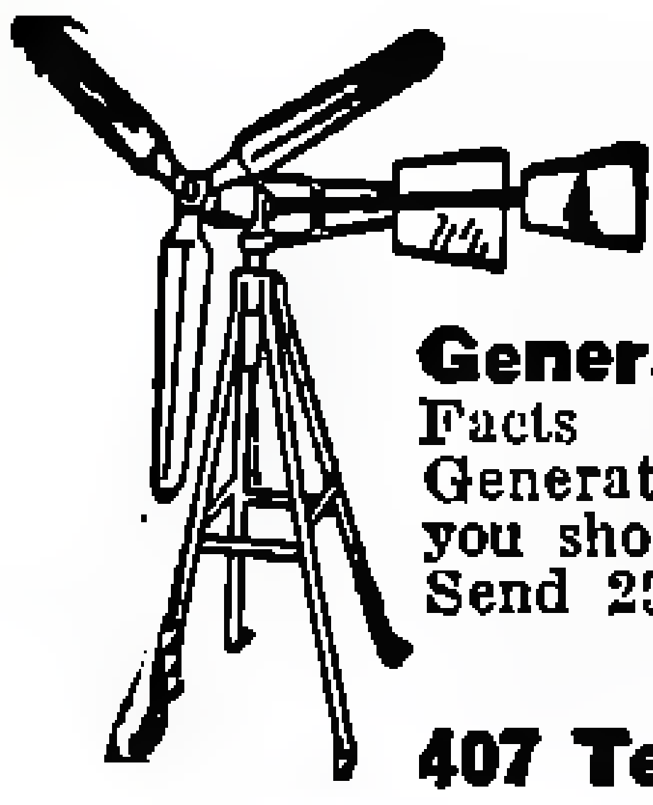

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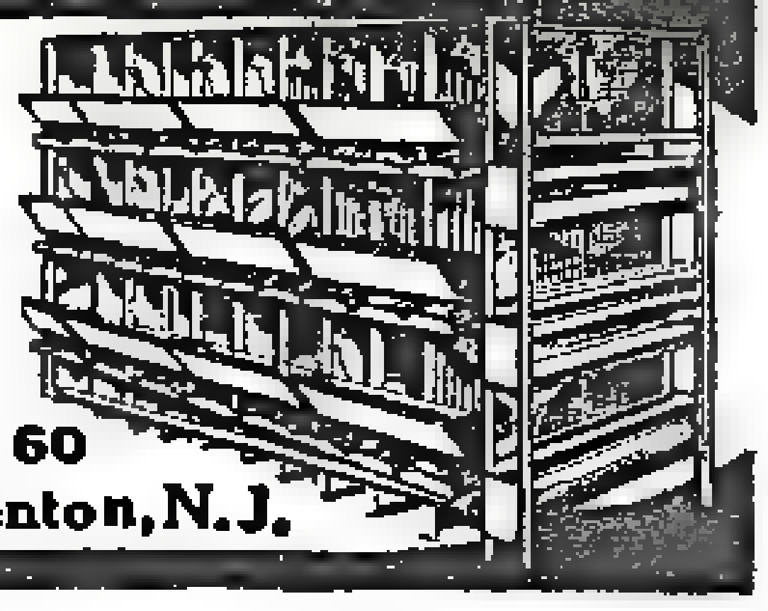

M.H.ARNDT MFG.CO., Trenton, N.J.

BUILD a camping trailer, boat, radio, games, toys, or furniture from MM blueprints. Select your plan now from this FREE illustrated catalog.

MODERN MECHANIX PUBLISHING CO.
Fawcett Bldg., Greenwich, Conn.

Please rush my free copy of the 1937 MM Blueprint catalog. I am enclosing a 3-cent stamp for postage.

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To help you answer these 3 questions:

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Drafting Opportunities Growing Daily

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Drafting welcomes ambitious men — offers good pay to start, with splendid opportunities for promotion. One of the *steadiest* of all lines. Right from the start, the beginner works side by side with experienced men—inking in their drawings, making tracings, constantly profiting by his contact with seasoned engineers. The "higher ups" see his work. If it is good, advancement is sure and steady.

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You can master Drafting readily by home study because you learn and advance *exactly* as professional Draftsmen work—with T-square, dividers and drawing board. *Actual* working conditions are duplicated to the final detail. *Thousands* of successful graduates enthusiastically endorse American School methods, nowhere better exemplified than in our Drafting course.

● We want you to see for yourself—before you come to ANY decision—exactly what Drafting is like. We want you to judge your own interest in the work—and our ability to teach you. So we make this 2 Free Lesson Offer.

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Prove That You Can Qualify

The 2 lessons will be sent absolutely without obligation. In the privacy of your own room, look them over. See how simply you start —how gradually you are led step by step—how thoroughly you master each point—how, as time goes on, you can pass from a raw beginning to complete *mastery* of Drafting—able to get and hold a pleasant, profitable, steady job. Such a future is well worth looking into RIGHT NOW, so . . . just mail the coupon!

Instruments and Materials
Lesson 1
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Principles of the Working Drawing
Part I—Projection Principles
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American School

Mail Coupon for 2 Lessons FREE

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Drexel Ave. at 58th St., Chicago

Without the slightest obligation, send 2 beginning Drafting Lessons and free Bulletin. I am not to return them.

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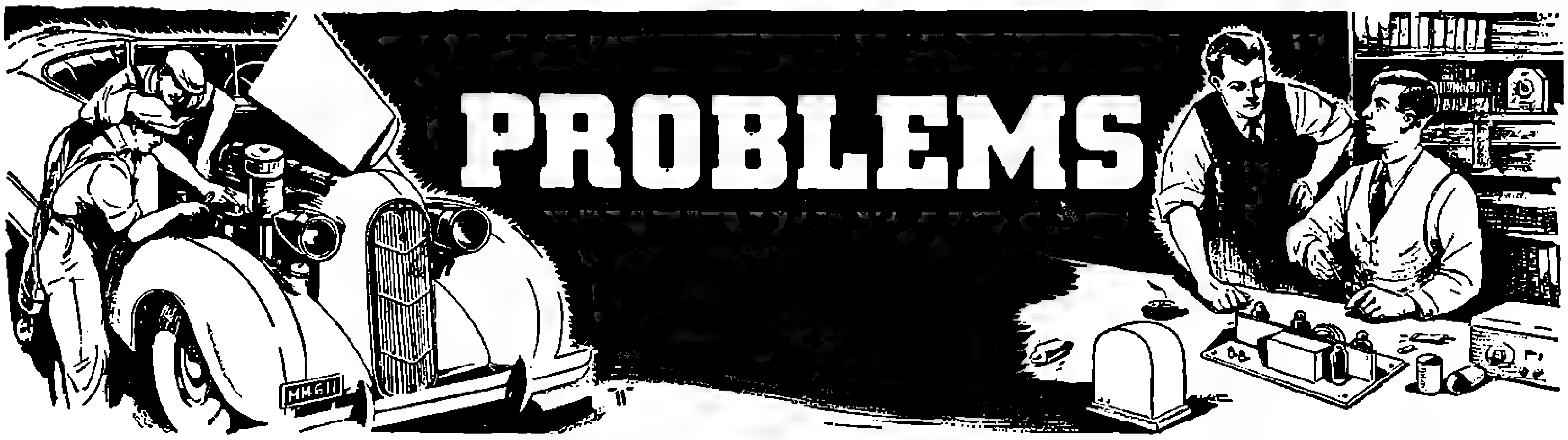
Address..

City..................................*State*..........



ANSWERS TO READERS' PERPLEXING PROBLEMS

Editor's Note: Your questions will be answered personally and free of charge by MM experts provided they do not require special research or involve trade secrets. Names and addresses of manufacturers of new products described in this issue can also be obtained free upon request. Enclose a self-addressed and stamped envelope for reply. Address: Problems Editor, Modern Mechanix Publishing Co., 1501 Broadway, New York City.

HOW HORSEPOWER OF ENGINES IS COMPUTED

Automobiles, steam engines and electric motors are all rated at some given horse power, yet I never have been able to understand just what method engineers use to determine the various ratings. Is a standard measurement employed on all devices or is a different system used for each type?—Walter Danna, Denver, Colo.

A standard rule of physics is used to determine the horse power rating of all mechanical equipment capable of delivering some form of power. The rule is based on the effort required to lift a 150 pound weight, 220 feet in one minute. If the effort were sufficient to raise the 150 pound weight 220 feet in one-half minute the horse power rating would be doubled or two horse power.

METHODS USED TO RECORD SOUND IN MOVIES

Is there more than one method used by motion picture studios in recording talking picture sound and if so how is it accomplished? Being an ardent motion picture fan I have often wondered just what principle was used, but have never succeeded in finding out.—Ray Donnovan, Boston, Mass.

There are three methods used in recording motion picture sound and each known by their trade name. Two methods employ what is known as sound-on-film while the third method is the recording of the sound on large wax discs similar to the transcriptions used by radio broadcasting stations. In the sound-on-film process a track is provided along the edge of the film for printing a graphic sound wave produced by a photo electric cell. The photo cell converts actual sound into a fluctuating ray of light which is converted back to sound by another photo electric device attached to the theater projector. There are two of these photo electric cell methods in use, but both operate on the same general principle.

MAKING BLUEPRINT PAPER FOR HOME SHOP USE

Can you tell me how blueprint paper is made? I have a number of workshop plans which I would like to distribute to my friends, but do not wish to give away or loan my original copies. If I could make blueprints of the plans by some simple method your advice would be most appreciated. —E. Doulval Reem, Philadelphia, Penna.

To make blueprint paper first choose a good grade rag content paper and on it sponge the following solutions, each being stored in different containers and mixed as used: In container "A" mix 10 drachms of Potassium Ferricyanide in 4 oz. distilled water. In container "B" mix 15 drachms Iron Ammonia Citrate in 4 oz. distilled water. Mix an equal amount of each solution into a container and apply to paper in a darkened room, allowing the paper to dry in a closet where no light will strike it.

To produce the blueprint, trace the plans in India ink on waterproof tissue and place tissue over the sensitive side of the paper. Lay a sheet of glass over the two and expose to bright sunlight for five minutes. Develop by washing treated paper in water. If prints are dull, expose longer; if very dark use a shorter exposure.

ELIMINATING RADIO INTERFERENCE NOISES

Our home is located in the vicinity of a beauty shop and noises produced by electrical equipment which they use is picked up by our radio receiver. Naturally this is very annoying and if at all possible I would like to know some method by which noise-free radio reception could be obtained. Any suggestions which you might care to make would be most welcome.—Carl Denton, Covington, Kentucky.

Electrical interference in radio receivers is the result of radio frequency impulses setup by motors, vibrators and similar apparatus operating in the vicinity of the receiver or carried over the electric power lines to it. In order to eliminate this very annoying effect some form of wave trap device must be inserted in either the antenna or power line or both if the interference is unusually bad. Many of these "traps" consist of tuned coils adjusted outside the frequency of the interference so that their passage into the radio receiver through the antenna or power line is impossible. Any radio dealer or mail order parts house can supply the necessary equipment for making this installation. The cost is nominal.

HOW TO START A STAMP COLLECTION

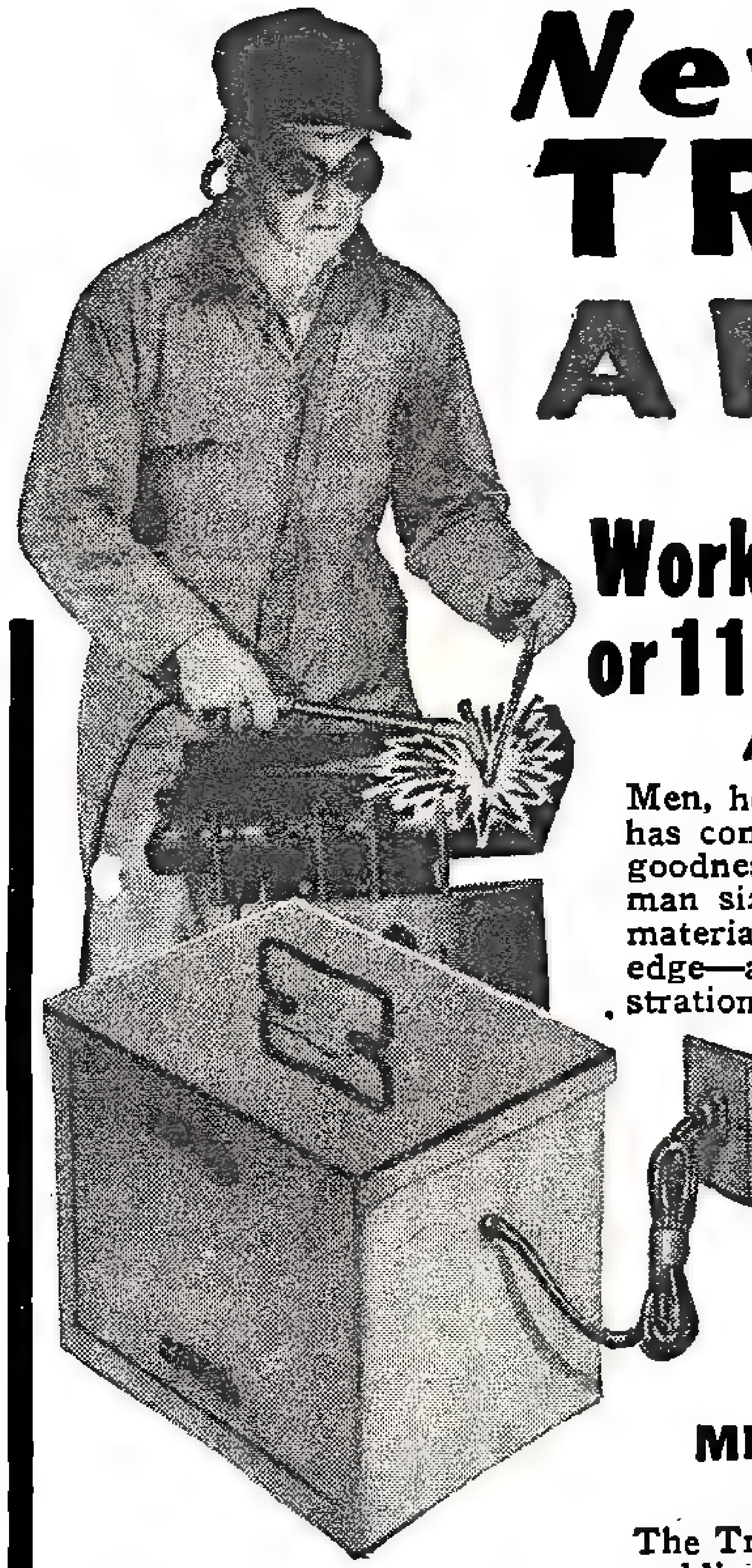
I am a boy 12 years old and would like to start a stamp collection. Where can I get foreign stamps and just how should I prepare a stamp album?—Russell Walker, Davenport, Iowa.

Starting a stamp collection is not at all difficult nor is it expensive. First purchase a package of foreign mixed stamps. Usually these stamps cost only a few cents for a package of one thousand. While many of them are duplicates you can trade them with your friends for others which you do not have. An album for beginners can be purchased at many 10-cent stores and new stamps can be obtained from any of the stamp dealers whose advertisements appear in this magazine.

[Continued on page 20]

New 6-Volt TRINDL Electric ARC WELDER

PATENTS PENDING



RETAILS FOR

$3.75 EA.

Works on Storage Battery or 110 Volt Light Circuit

A REAL WELDER

Men, here is the hottest specialty item that has come along in years. A real honest to goodness electric arc welder that does a man size job. Built sturdily of the finest materials. Requires no mechanical knowledge—any one can use it. Every demonstration should make a sale. This new Trindl Electric Arc Welder is made possible by the invention of a low voltage carbon which gets white hot from the current of an ordinary 6 volt storage battery such as in your automobile. It only uses about 20 to 25 amperes of current which is about the same current drain as 4 headlight bulbs, yet develops about 7000 degrees of heat.

MELTS IRON AND STEEL INSTANTLY

The Trindl Welder is simple to use. Expert welding can be done by anyone. The Trindl Arc Welder is the only battery welder that, after a rigid test, has been approved by the Automotive Test Laboratories of America. It is ideal for making permanent fender repairs—also for broken castings, radiators, cylinders, water jackets, holes in auto bodies, hog troughs, boilers, tanks, milk cans, radios, batteries, etc. Iron, Steel, Brass, Copper and Tin can be worked on for a quick and permanent repair. The repaired part will be as strong as before.

NEW 110 VOLT CONVERTER MAKES FULL SIZE PROFESSIONAL UNIT

This new converter pictured above is used on any 110 volt 60 cycle electric light socket in place of a storage battery. It is especially designed to be used with the $3.75 Trindl Electric Arc Welder—COSTS LESS THAN A GOOD BATTERY—The combination makes a full size professional electric arc welder that everybody can use. Ideal for fender and repair shop needs. This is a sensation, not only in price but also in actual results. The converter represents the same fine construction and engineering skill as the arc welder. The complete outfit, including the transformer, is easily portable so that it can be brought right to the job.

USERS SWEAR BY IT—The price is so low that now anyone can afford to have a real welding outfit. Think of the profit you can make introducing this Trindl Welder and Converter—a simple five minute demonstration should make a sale to every interested prospect, especially when they hear the amazingly low price. Garages, radio and battery men, tinners, sheet metal workers, janitors, farmers and home-owners all need the Trindl Welder and Converter.

ACT NOW! There are big profits and a steady business waiting for you, taking care of your territory for us. Don't let someone else get in before you—Send coupon Today.

TRINDL PRODUCTS

2229-HR Calumet Ave., Chicago, Ill.

FACTS

Here are just a few excerpts from the many letters of praise we have received from Trindl Electric Arc boosters.

"Please find enclosed for 12 welders by return mail for I am about sold out now. They are selling fine."—W. C. Anderson, Nebr.

"Received my Trindl Arc Welder and am both pleased and surprised." — Louis F. Glier, Ohio.

"Results are very gratifying with your welder. I am enclosing an order for 12 more Electric Arc Welders."—Nelson O. Lyster, Fla.

"I received my welder, and it is a regular repair shop in itself."—J. R. Harper, La.

"I sold 4 of your Trindl Electric Arc Welders in three minutes."—C. Gillies, Canada.

"I sold 9 welders in my first ten calls."—F. W. Stice, Iowa.

$10.50 a day profit for you for only selling 6 Trindl Arc Welders. No matter where you turn, you will find people who will want to buy arc welders from you. Garages, shop men, radio repair men, farmers, home-owners, mechanics, janitors, all of them need Trindl Electric Arc Welders. Be the man in your territory to clean up with Trindl.

MAIL COUPON NOW!

TRINDL PRODUCTS
2229-HR Calumet Ave.
Chicago, Illinois

Yes! Rush me free particulars of how I can make big money with Trindl Electric Arc Welders and Converters. This does not obligate me in any way.

Name ....

Local Address ....

City ....

State ....

Potato Chip Business

GREASELESS POTATO CHIPS

Here's your opportunity to get in business for yourself. Turn potatoes into cash by making potato chips. I'll show you how with my improved outfit. Makes delicious, crispy, tasty, superior "greaseless" chips at a surprisingly low cost. Also Doughnuts and Salted Nuts. Very little cash needed. No previous experience required if you follow the instructions and selling plans I furnish. Begin in any location, village, city or suburb. An opportunity is waiting. Steady year 'round business. Groceries, delicatessens, restaurants, taverns do the retailing for you. Merely keep them supplied.

WE HELP START YOU IN BUSINESS

Raw material plentiful and low priced. Simplified process and confidential plans. Profit large—unusually so. Enormous quantities of Potato Chips are bought daily.

WE HAVE A CREDIT PLAN

Find out how you can buy equipment on a monthly payment plan. Let us tell you what others say about the Potato Chip business. Get all the facts. Get into this dignified, year 'round business with [illegible] money-making opportunity. Send for FREE booklet entitled, "How to Start a Factory". Do this AT ONCE.

Complete 18-unit Outfit includes new type white vitreous enamel ROUND Cooking Vat; Direct-to-fat high speed slicer; centrifugal Grease Extractor; Thermometer—Positively everything necessary to start —all at new low price.

LONG-EAKINS COMPANY
642-S High St., Springfield, Ohio

Men & Women Earn Cash at Home!

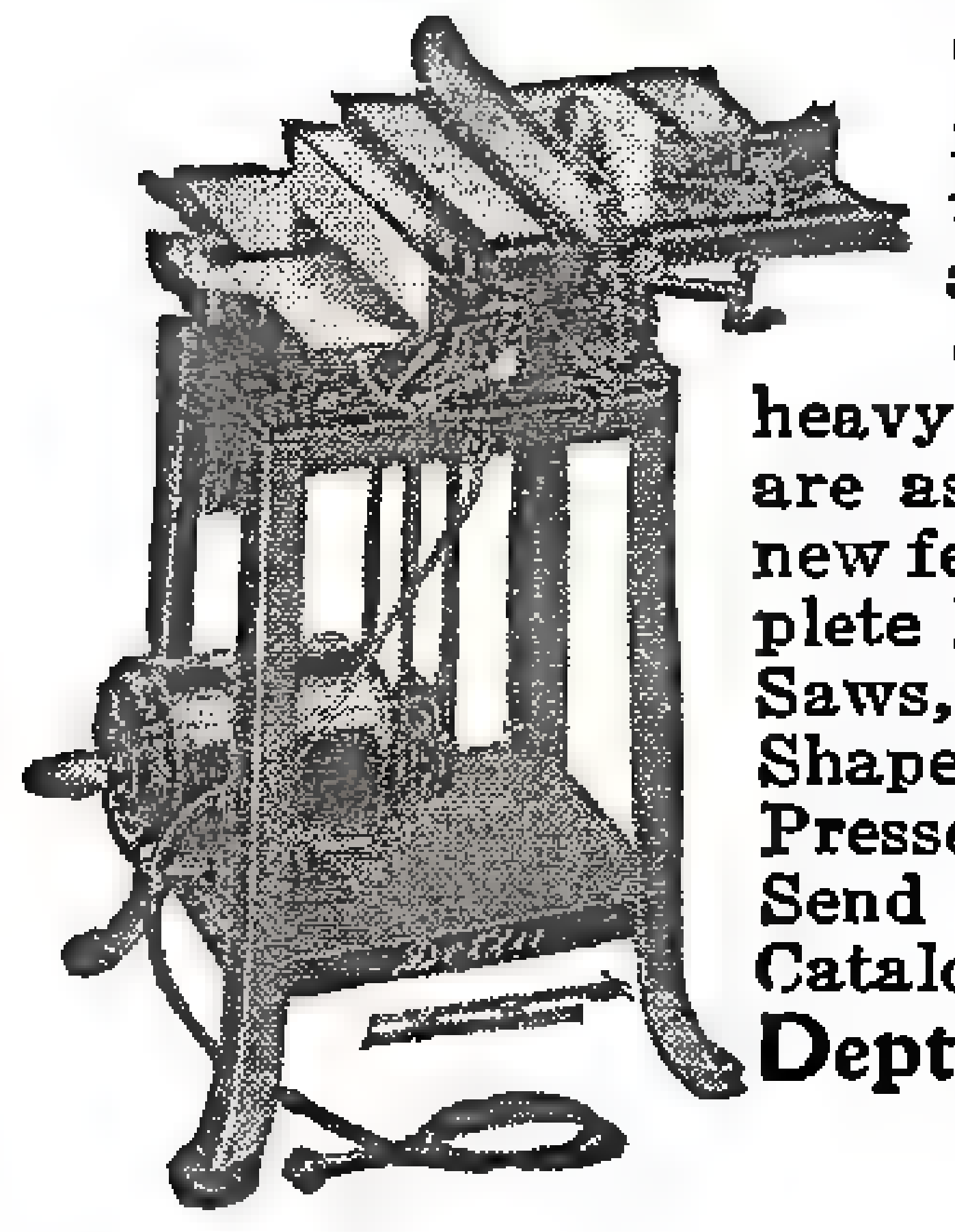
We paid M. M. $267 in 3 weeks for exceptional "cellar crop" patented mushrooms! Big free picture book tells if your cellar, shed, barn suitable. We buy all crops thru ten branches. Write today. (Estab. 1908.)

UNITED MUSHROOM CO.
3848 Lincoln Ave., Dept. 314 Chicago

EXPERIMENTERS!

The latest thing out! "The Invisible Control." With this new, easy to build, and inexpensive device, you will light lights, ring bells, operate the radio and other electrical appliances by merely POINTING AT THEM! There are no concealed switches or buttons to push. Made entirely from old Radio Parts. Blue prints and all instructions $1.00.
Address "THE WONDER LAB", Box 160, Grand Central Annex, N. Y.

Send for CATALOG of Motor-Driven Tools



Thousands of home workshops, factories, builders, farms are using these new compact portable, rugged and efficient motor-driven tools. They stand the heavy grind of continuous use—yet are astonishingly low priced. Many new features and improvements. Complete DELTA line includes: Circular Saws, Scroll Saws, Lathes, Jointers, Shapers, Band Saws, Grinders, Drill Presses—and full line of accessories. Send today for big 48 page FREE Catalog

Dept. M537, DELTA MFG. CO.
600-634 E. Vienna Ave.
Milwaukee, Wis.

Problems

[*Continued from page* 18]

EFFECTIVENESS OF CYLINDER REBORING

My car has traveled 60,000 miles and much of its original power has been lost. Do you think it advisable to have the cylinders rebored? Would this result in a saving of fuel and an increase in power?—Ralph Logan, Ft. Wayne, Ind.

Unless the walls of your cylinders are scored a set of new piston rings would no doubt increase your car's power and reduce fuel consumption. In cases where broken rings have damaged the cylinder wall honing or reboring is advised. The reboring operation will provide smooth cylinder walls so that the pistons will operate at maximum efficiency.

WATERPROOFING DAMP WALLS

During the spring our living room walls become very damp and oftentimes small drops of water form on the surface resulting in considerable annoyance. Is there any method whereby the dampness can be eliminated without too great an expense?—Roy Page, Trenton, N. J.

In order to prevent moisture from seeping through the plaster it will be necessary to apply several coats of sizing at a time when the wall is dry. Shellac is a good waterproofing compound for walls that are papered. The old paper should be scraped off and the shellac applied, allowed to dry thoroughly and new wallpaper hung.

While the wall treatment suggested will keep moisture from seeping through the plaster it is advisable to check this condition at its source. The best way to do this is to surface the outside walls of the house around the bottom with cement to a height of 18 inches. Apply the cement with a trowel to a thickness of ½-inch. The concrete will prevent water from seeping into the walls and eliminates objectionable moisture from collecting on the interior plastered wall surfaces.

CLEANING AND POLISHING MARBLE

Recently I purchased an antique table which is fitted with a marble top. It is my desire to restore this table to its original beauty, but I have been confronted with the problem of cleaning up the top so as to bring out the true marble finish. Is there any simple method whereby I can remove the grease and grime from the marble without damaging the surface?—Lester Funk, Portland, Maine.

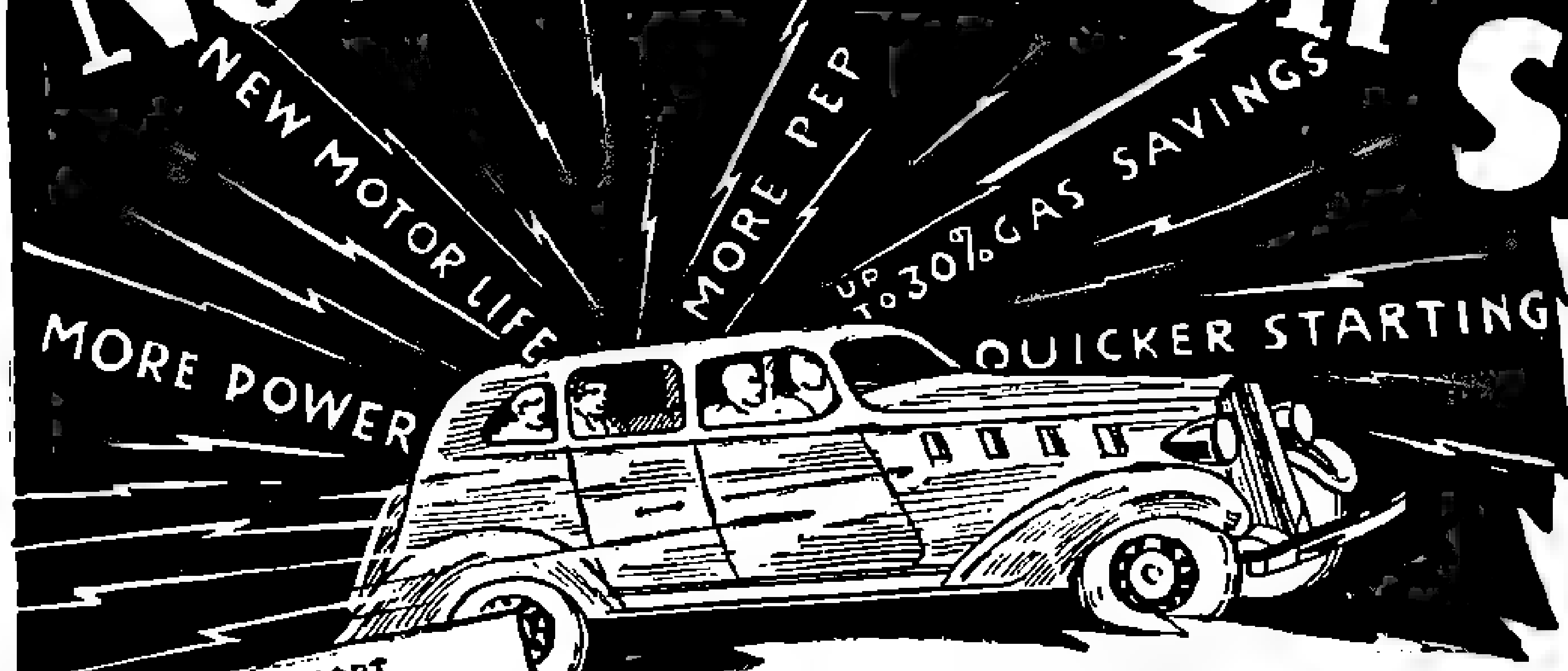
To clean marble surfaces apply a weak solution of oxalic acid with a cloth until all dirt has vanished then wash off thoroughly with water so as to remove all traces of acid. After this treatment the marble will be somewhat dull, but it can be polished to a fine luster with finely powdered chalk and a damp cloth.

AUTO PRODUCES GRINDING GEAR NOISES

When I drive my 1930 car over 30 miles per hour a loud grinding noise is heard. Although I replaced the original gears with a new set the noise continues. I have even tried a very thick bodied oil with no results. Can you advise as to the cause of trouble and how it might be corrected?—Ard Miller, Fleetwood, Pa.

From the description given the trouble is in the differential. Unless attended to at once serious damage to your car may result. The gears are in dire need of attention and are slowly grinding away. A simple check-up, for determining whether or not the differential is at fault, can be made by jacking up the rear car wheels and allowing the car to run at a slow speed in high gear and listening for a faint buzzing sound.

New Invention WITH SUPERCHARGE PRINCIPLE SAVES GAS



AT LAST! Automotive engineers have smashed down the barriers to perfected combustion! The new VACU-MATIC solves the secret of greater power! With almost magical action, this amazing invention instantly puts new life and pep in any motor. It adds mileage to every gallon of gasoline . . . produces split-second pick-up, sensitive accelerator response, quicker starting, greater speed and smoother running.

Automatic — Nothing Like It!

The self-starter — four wheel brakes — knee action — streamlining . . . and now VACU-MATIC! The sensational money-saving invention! With it, engineers have achieved a practical means of balancing air and gasoline automatically for all speeds.

VACU-MATIC is *entirely different!* It operates on the supercharge principle by automatically adding a charge of extra oxygen, drawn free from the outer air, into the heart of the gas mixture. It is entirely AUTOMATIC and allows the motor to "breathe" at the correct time, opening and closing automatically as required. No idling troubles—no carburetor adjustments necessary. It is so simple it will amaze you—so practical it will save you many dollars on gas costs.

USERS REPORT 3 to 7 MILES MORE PER GALLON

MOTORIST SAVES $180.00 a YEAR

"On my V-8 Ford it works miracles. Its added power, acceleration and top speed has sold me. The results are unbelievable."—*Ralph Fields, Mass.*

"Very glad to say, the Buick showed an increase of 5 miles more per gallon."—*A. V. Grove, Washington.*

"On my Plymouth, I obtained an average of 22 miles per gallon, an increase of 7 miles. This means a saving of $15 a month or $180 a year."*F. S. Peck, Calif.*

"It saves me one gallon a day. I had to buy 5 gallons each day—now only 4 gals."—*L. V. Sweet, Pa.*

"I have twelve VACUMATICS on cars now, and they all show an increase in mileage. The car owners are very well pleased."—*Fred Taylor, Okla.*

"I have been placing VACU-MATICS on expert mechanics' cars. All are well pleased."—*J. W. Donahue, W. Va.*

Guaranteed Gas Savings

VACU-MATIC proves itself on every car. It is guaranteed to give worthwhile gas savings, quicker pick-up, and more power or it costs you nothing. You can instantly tell the difference in added power and motor performance — you quickly notice the cash savings on gasoline.

Fits All Cars

VACU-MATIC is constructed of six parts, assembled and fused into one unit, correctly adjusted and *sealed at the factory.* Nothing to regulate. Any motorist can attach VACU-MATIC in ten minutes. Once in, its only reminder is the surge of instant power and speed it gives to the motor and the savings it affords your pocketbook.

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VACU-MATIC offers a splendid opportunity for unusual sales and profits. Valuable territories now being assigned. Check and mail coupon.

Free Details

You owe it to yourself to know all about this remarkable discovery. Mail the coupon below. Start saving gas with VACU-MATIC and enjoy a new driving thrill! There's no obligation—so get the facts now! Write today!

The VACU-MATIC Co. Wauwatosa, Wis.

FREE OFFER COUPON

THE VACU-MATIC COMPANY
7617-305 W. State St., Wauwatosa, Wis.

Gentlemen: Please send me full particulars concerning the VACU-MATIC and details of your Free Offer. This of course does not obligate me in any way.

Name ______________________

Address ______________________

City ______________ State ______________

☐ Check here if interested in selling proposition.

MARVEL SOLDERING FLUX

Quickly tins Rusty Iron and Steel—Galvanized Metal—Corroded Copper—Aluminum—White Metal and Oily Surface.
Solders Aluminum to Steel.
No Acids or Cleaners needed.
A Revolutionary Chemical Compound for Tinsmiths—Plumbers—Farmers—Garages—Fishermen and General Household Use.

DOWNER SALES CO.
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GENEROUS SUPPLY
65c
POST PAID

HAVE YOU SOME SPARE ROOM

a basement or garage where you can do light work? We can offer you a profitable proposition for 1937 casting new 5 and 10c Novelties, Ashtrays, Toy Automobiles, etc., as Manufacturer for firm of many years standing. No experience necessary and small outlay starts you. If interested in devoting your spare or full time to profitable work write AT ONCE as we are now closing arrangements for supply of our goods.

METAL CAST PRODUCTS CO.
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RAISE GIANT FROGS

NUFOND GIANTS WEIGH UP TO 3 LBS. EACH

EASY TO START!

MARKETS WAITING. Frog legs in big demand at good prices the year round. Millions used yearly!

WE BUY We have one of the largest frog markets in the world! Easy to ship. Sell to us in addition to other markets.

MEN AND WOMEN starting in every state and Canada. See what others already doing. Small pond starts you. **FREE FROG BOOK** explains our unusual offer to beginners! Now's the time to begin! Write today!

FREE BOOK

A Future in Frogs

AMERICAN FROG CANNING CO.
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ARE YOU JUST HOPING TO LAND IN A GOOD JOB?

HOPE without foundation is pretty futile in this competitive age! But hope *plus training* is a winning combination—and all over this country today, in all kinds of professions and trades, men are getting ahead—landing in good jobs—earning more money—because of serious and systematic study of International Correspondence Schools' courses. These courses are giving them the training they need to succeed! As for you, investigation will not put you under any obligation. Mail the coupon!

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Without obligation, please send full particulars about the subject before which I have marked X:

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☐ Architectural Draftsman
☐ Building Estimating
☐ Contractor and Builder
☐ Structural Draftsman
☐ Structural Engineer
☐ Electrical Engineer
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☐ Telephone Work ☐ Radio
☐ Mechanical Engineer
☐ Mechanical Draftsman
☐ Machinist ☐ Toolmaker
☐ Patternmaker
☐ Foundry Practice
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☐ Steam Engineer
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☐ Marine Engineer
☐ Civil Engineer ☐ Highway Engineer
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☐ Bridge and Building Foreman
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☐ R. R. Locomotives ☐ Air Brakes
☐ R. R. Section Foreman
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☐ Chemistry ☐ Pharmacy
☐ Coal Mining
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☐ Cotton Manufacturing
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☐ Agriculture ☐ Fruit Growing
☐ Poultry Farming

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☐ Business Management
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☐ Professional Dressmaking and Designing
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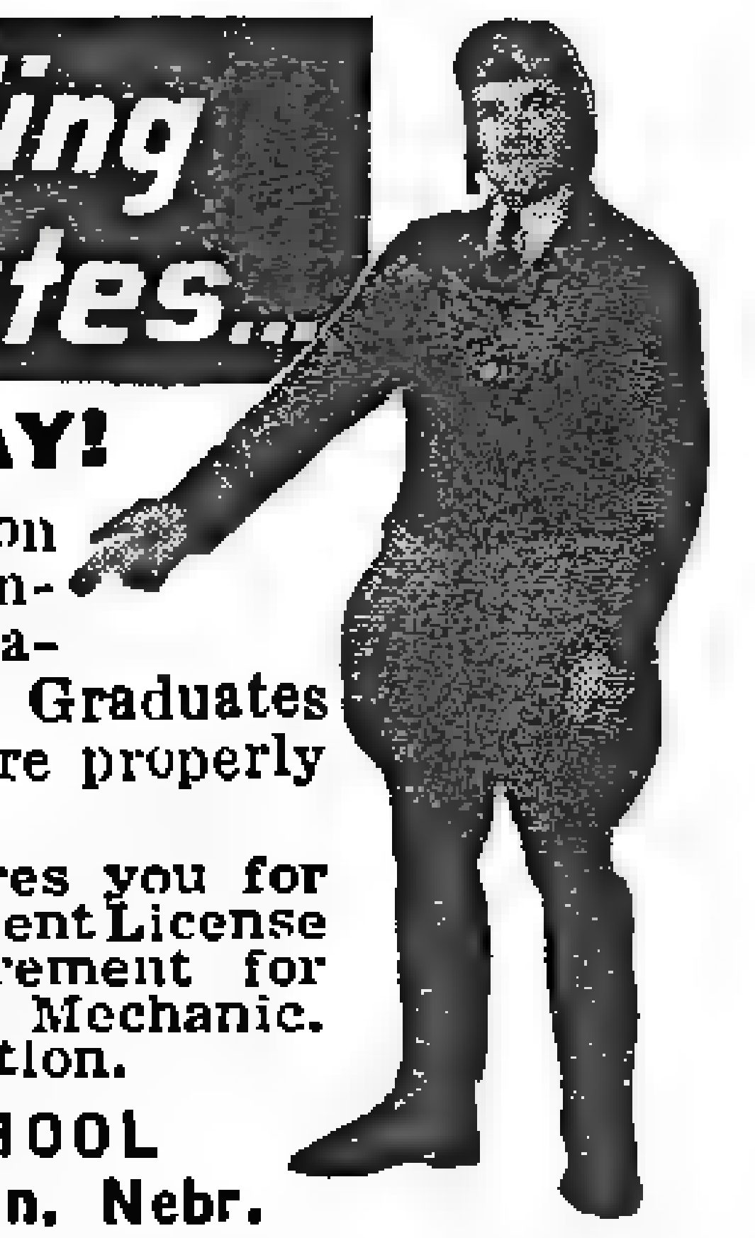
Name...*Age*..................

Address..

City...*State*..................................

Present Position...

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada



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Lincoln Government Approved Training prepares you for aviation's better pay jobs. Training for Government License as Pilot, including Transport. Every requirement for Government License as Airplane and Engine Mechanic. Sheet Metal Training. Write for full information.

LINCOLN AIRPLANE & FLYING SCHOOL
401G Aircraft Bldg., Lincoln, Nebr.

Operator No. 38

FOLLOW THIS MAN

Secret Service Operator No. 38 is on the job! Running down dangerous Counterfeit Gang. Telltale finger prints in murdered girl's room.

Free *The Confidential Report Operator No. 38 made to his chief. Write for it.*

Earn a Regular Monthly Salary

YOU can become a Finger Print Expert at home, in your spare time, at small cost. Write for confidential full report and details. Literature will NOT be sent to boys under 17 years of age.

INSTITUTE OF APPLIED SCIENCE
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FREE Send your name for free booklet describing NEON'S opportunities: complete data on practical home study course, letters from students. Very low cost! WRITE TODAY!

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Clothing, Dry Goods, Shoes, Notions, School Supplies, Novelties, Punch Boards, Razor Blades, Drug Sundries, Cosmetics, Perfumes, Food Products, Soaps, Carded Goods, Specialties, etc. Big Illustrated Catalog FREE.

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Reconditions Motors Like Magic!

Easily installed in few moments! Increases compression. Cuts gas and oil costs. Saves rebore job and new rings! RESULTS GUARANTEED. Build own business. Sell garages, service stations, car owners, dealers. Millions of buyers! Write TODAY for FREE DEMONSTRATING SAMPLE and "No Risk" money-making plan.

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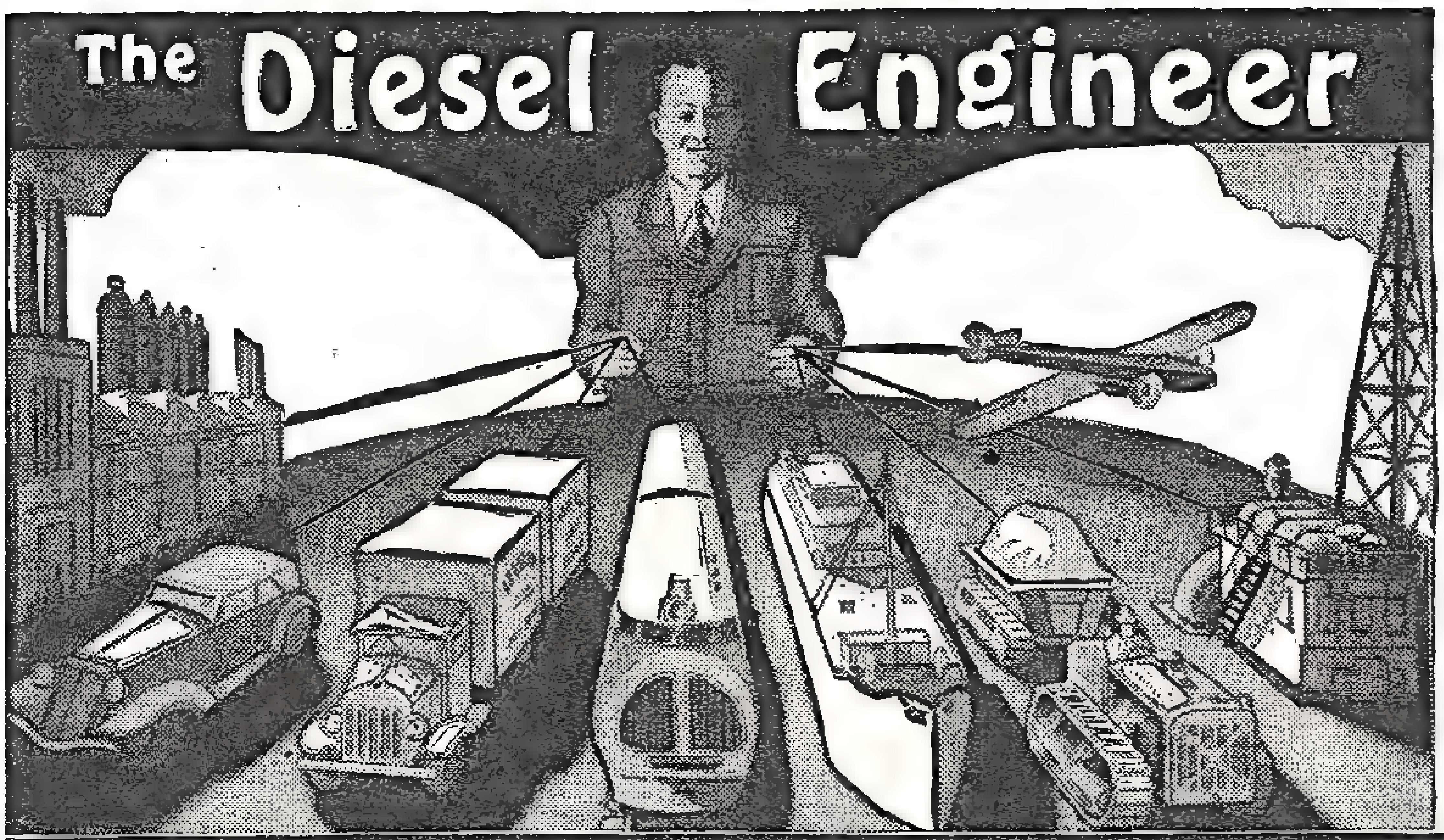

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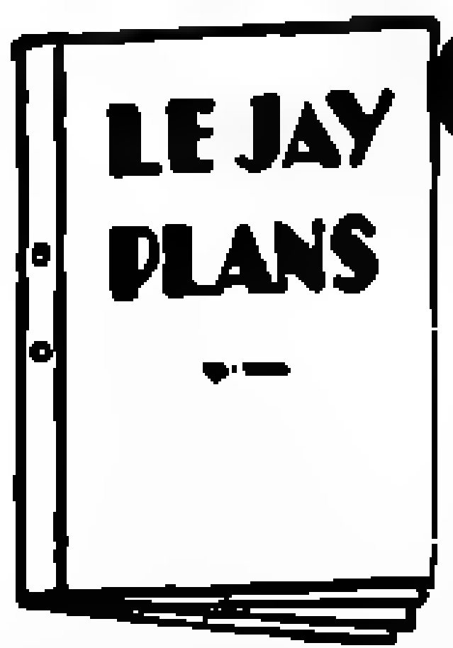

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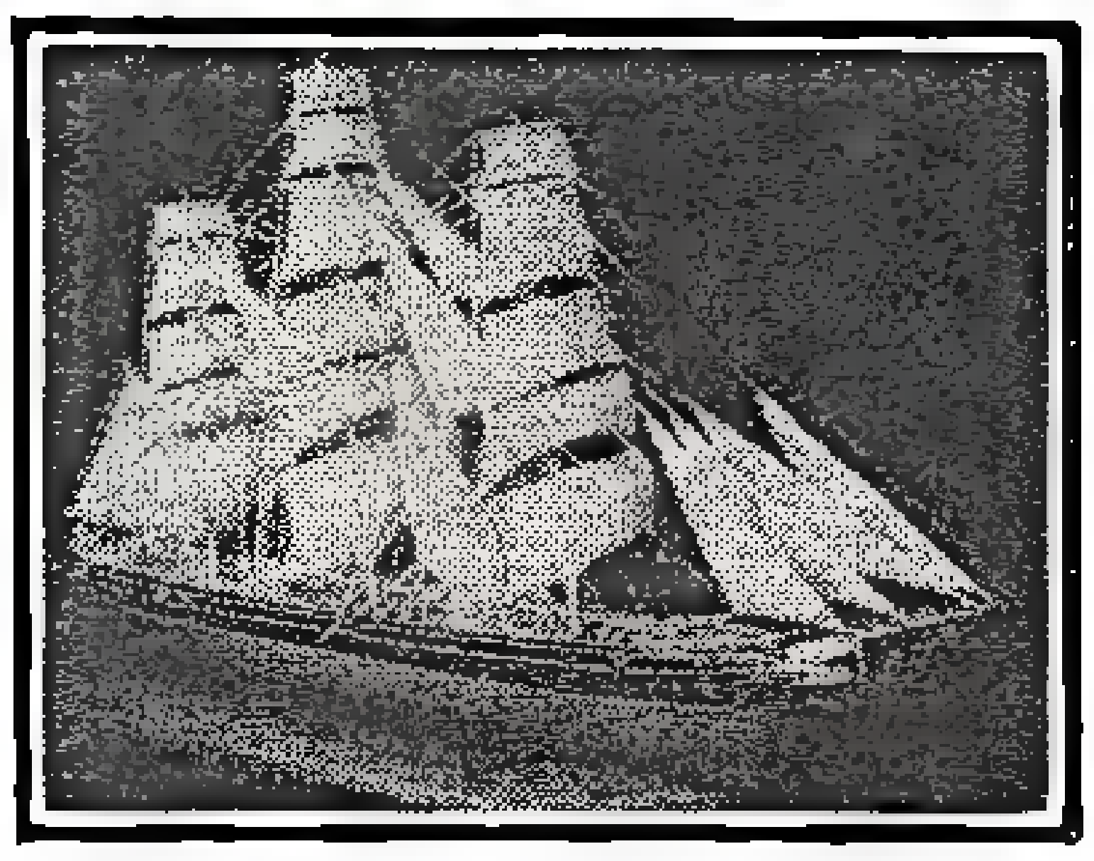

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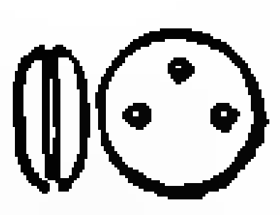

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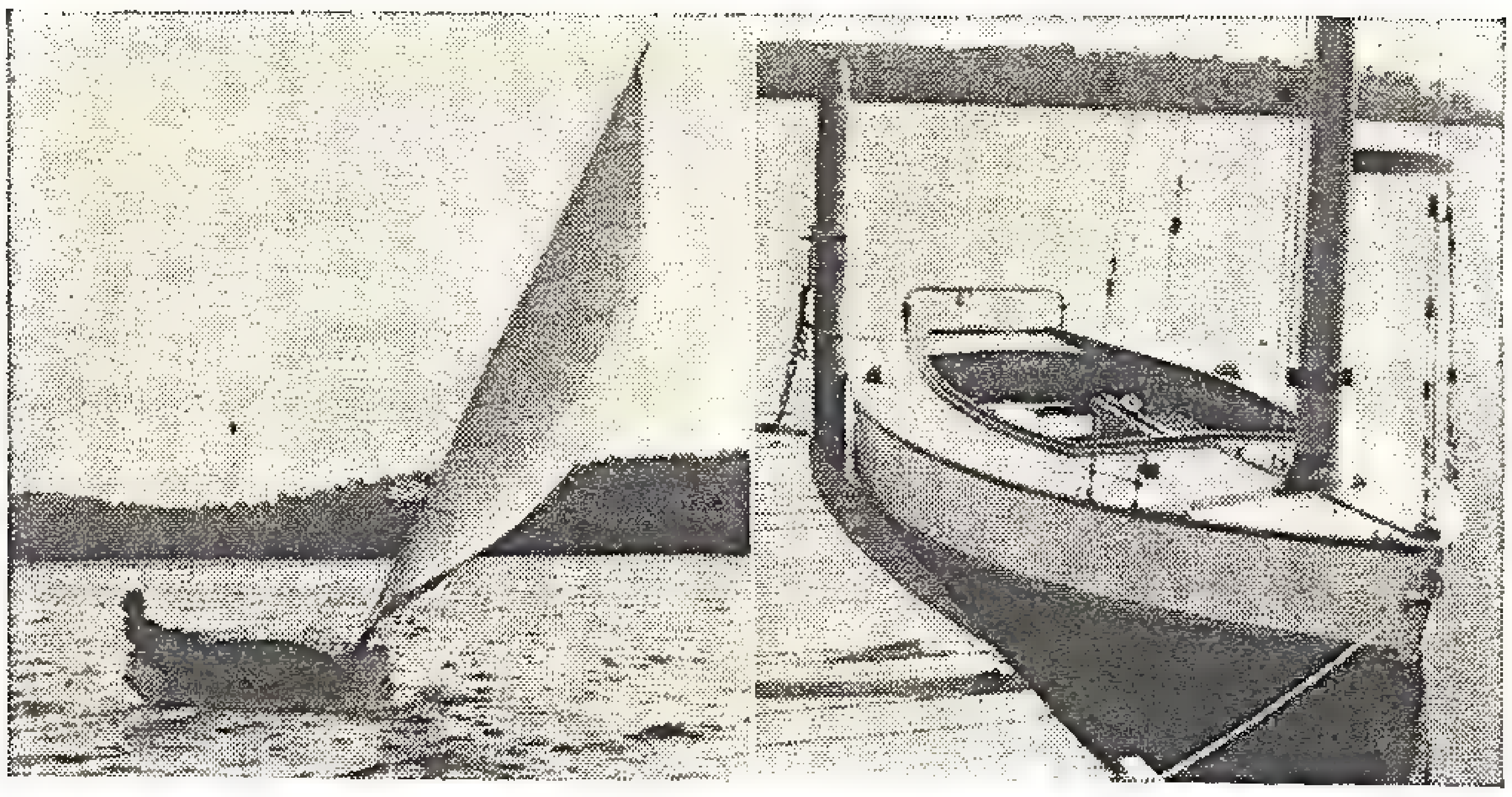


Sailing, sailing—and Raymond Smedberg, of Centredale, R. I., does plenty in the Olympic V-bottom boat he built from MM plans. Close-up and sailing views show boat's beautiful lines and excellent construction details.

JUDGING from the increased number of letters and photos received by the Workbench, it is apparent that many home craftsmen are entering a period of renewed activity. Perhaps the approach of Spring has something to do with it, inspiring workshop fans to hastily complete projects started during the cold winter months so that they will be ready to enjoy every possible minute on the open road, lakes, woodlands, and seashore.

Without a doubt, the boats, midget autos, trailers, and other interesting outdoor projects, of which we have seen photos, are going to provide some mighty enjoyable days for many readers who have been poring over MM plans and working with lathe, power saws, and the lowly hammer and nails.

To readers who have completed projects we extend congratulations. To those who have not we again say that it is never too late to start. No matter what season of the year you will find interesting articles and plans in every issue of MM, or in any of the books—"How To Build Trailers," "How To Build 20 Boats," or "How To Build It," which can be secured direct from the MM office in Greenwich, Conn., at the popular price of only 50c each.

***

Heading the list of Workbench prize winners this month, Raymond B. Smedberg sent in photos and a letter that were awarded first prize of $5. He writes:

Centredale, R. I.

Dear Editor:

Enclosed are photos of my Olympic monotype V-bottom catboat that I built from MM boat plans during my spare time. The sails, too, are made according to MM plans.

The boat has proved very satisfactory on salt water as well as fresh water and an old sailor who tried it out stated that it was the best small boat he ever sailed. It is very seaworthy and handles well in light or strong winds.

Building your own boat is easy and economical when MM boat plans are used. Thanks to MM for putting out really easy-to-understand plans.

Raymond B. Smedberg.

The combination of good boat plans and Smedberg's craftsmanship has certainly resulted in a sailboat of beautiful lines and seaworthy characteristics as the photos plainly show.

***

The height of the trailer season will soon be upon us and W. Thrasher, of Hamilton, Ontario, Canada, has made ready for it by constructing a streamlined trailer. In his letter which was awarded a $3 prize, he says:

Dear Editor:

I am instructor in carpentry, joinery and building at Hamilton Technical Institute and would like to receive an MM blueprint catalogue.

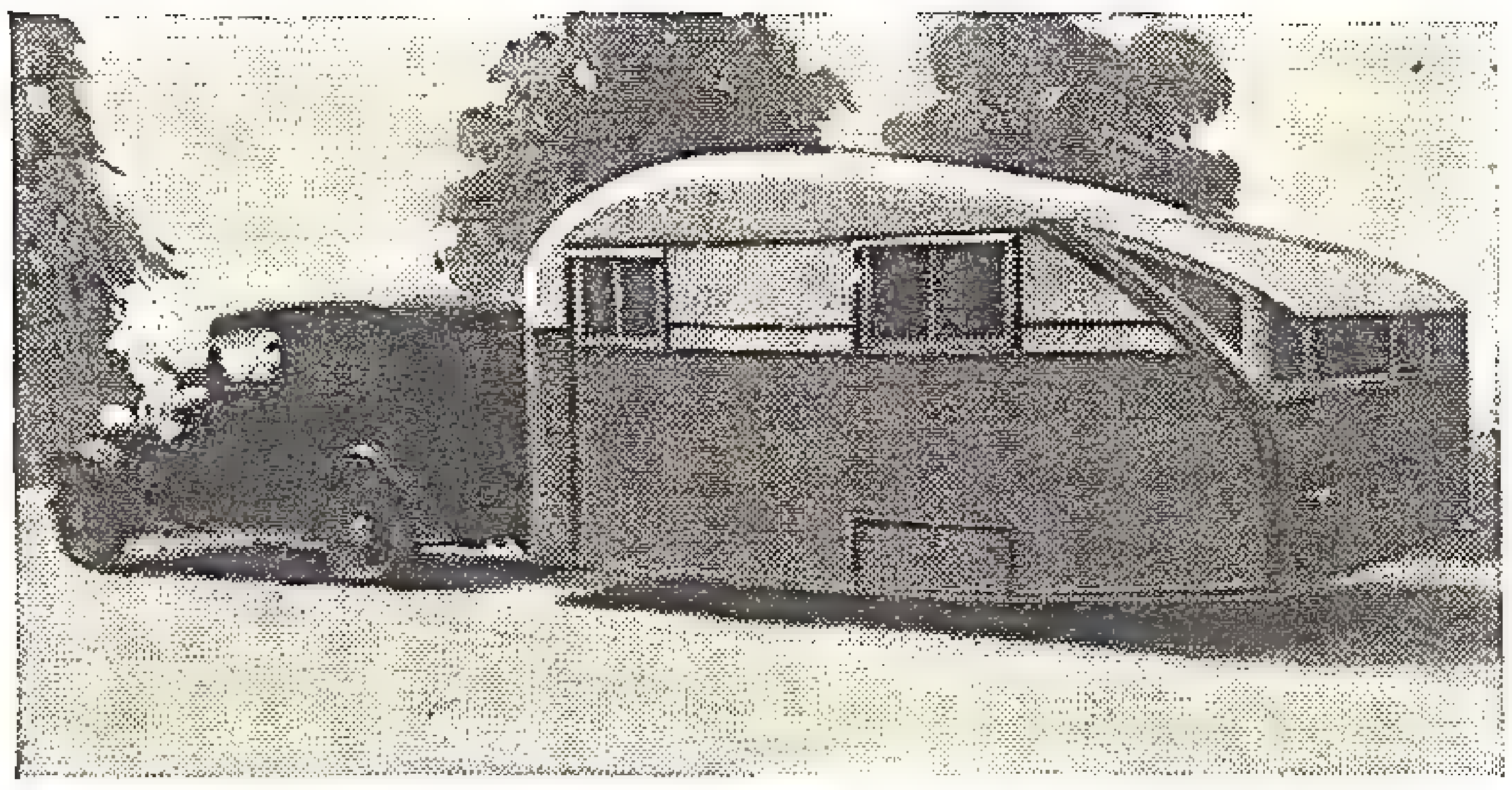
My students are particularly interested in trailers, planes, and boat building. I am sending a photo of a trailer built in spare time. The top folds down at the rear end to give a streamlined effect when traveling.

W. Thrasher.

The booklet has been mailed to Mr. Thrasher and we know his students will find projects that will provide ample outlet for their energies and craftsmanship.

***

A prize of $3 was awarded to Orville W. Odle, of Hartford City, Ind., whose letter states:



Featuring a rear top that can be lowered to create a streamlined appearance when traveling, this roomy trailer was built by W. Thrasher, a teacher in Hamilton, (Ont.) Canada.

the Editor's Workbench

Dear Editor:

Enclosed is a photo of a pedal locomotive made from plans that appeared in MM. It was made in a basement with common tools and has bronze bearings.

Heavy enough for a ¾-horsepower engine, the locomotive stands 46 inches high and is 94 inches overall length.

The locomotive is very realistic in appearance and you can imagine how my five-year-old son's eyes "popped" when he first saw it. The American Legion asked for permission to take the model to their state convention.

Orville W. Odle.

Yes, we can very well imagine how many little eyes would "pop" if they were fortunate enough to see a miniature locomotive that can be pedaled along the streets. Good work, Mr. Odle.

⁂

Midget racers still appeal to many home workshop fans and a letter and photos describing a finely built one won a $3 award for J. R. Halley, of Philadelphia, Pa., who says:

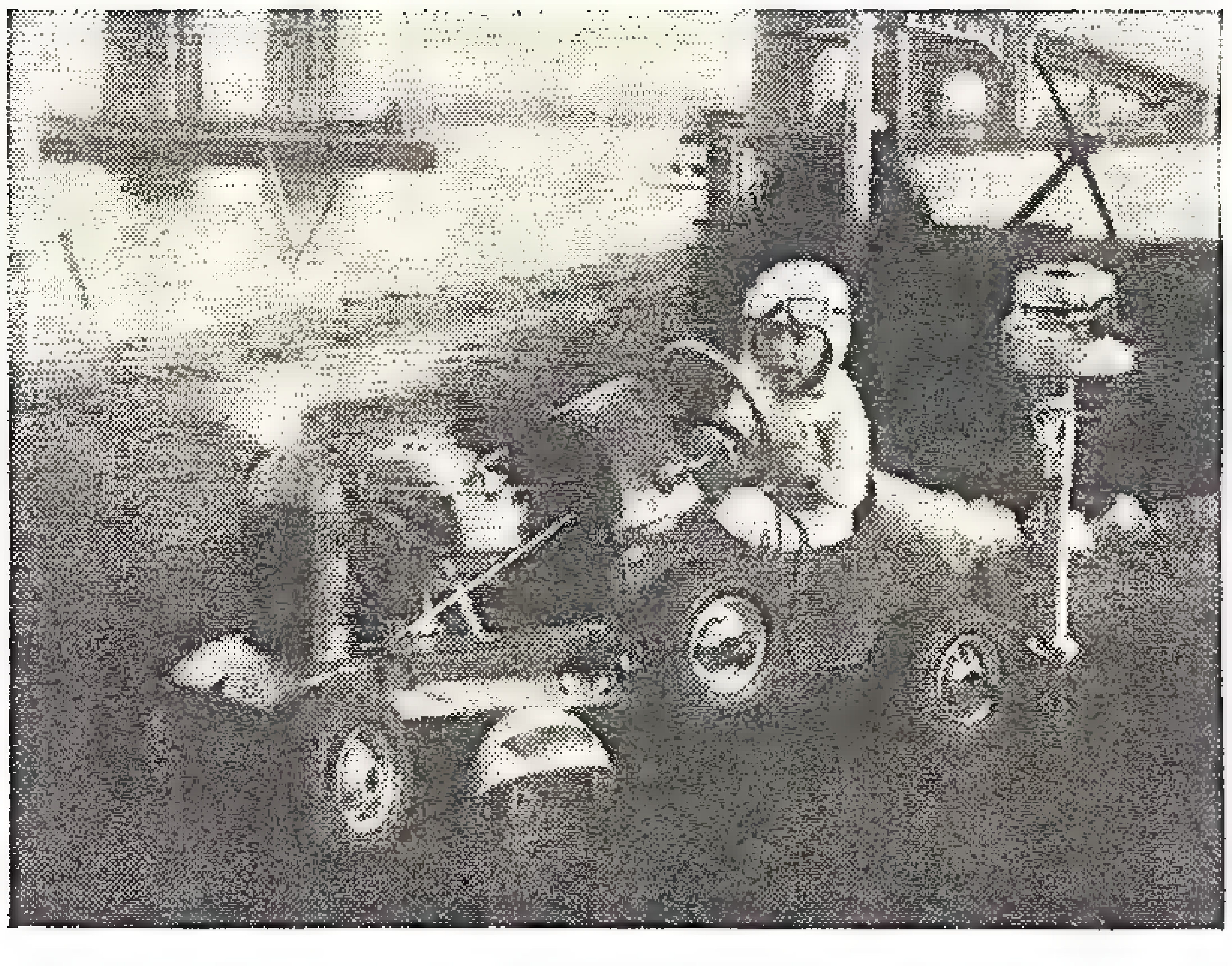
Dear Editor:

Reading your magazine has been great, but when you talk midgets you want to consult Philadelphia. I am sending you a photo of what we consider a real midget.

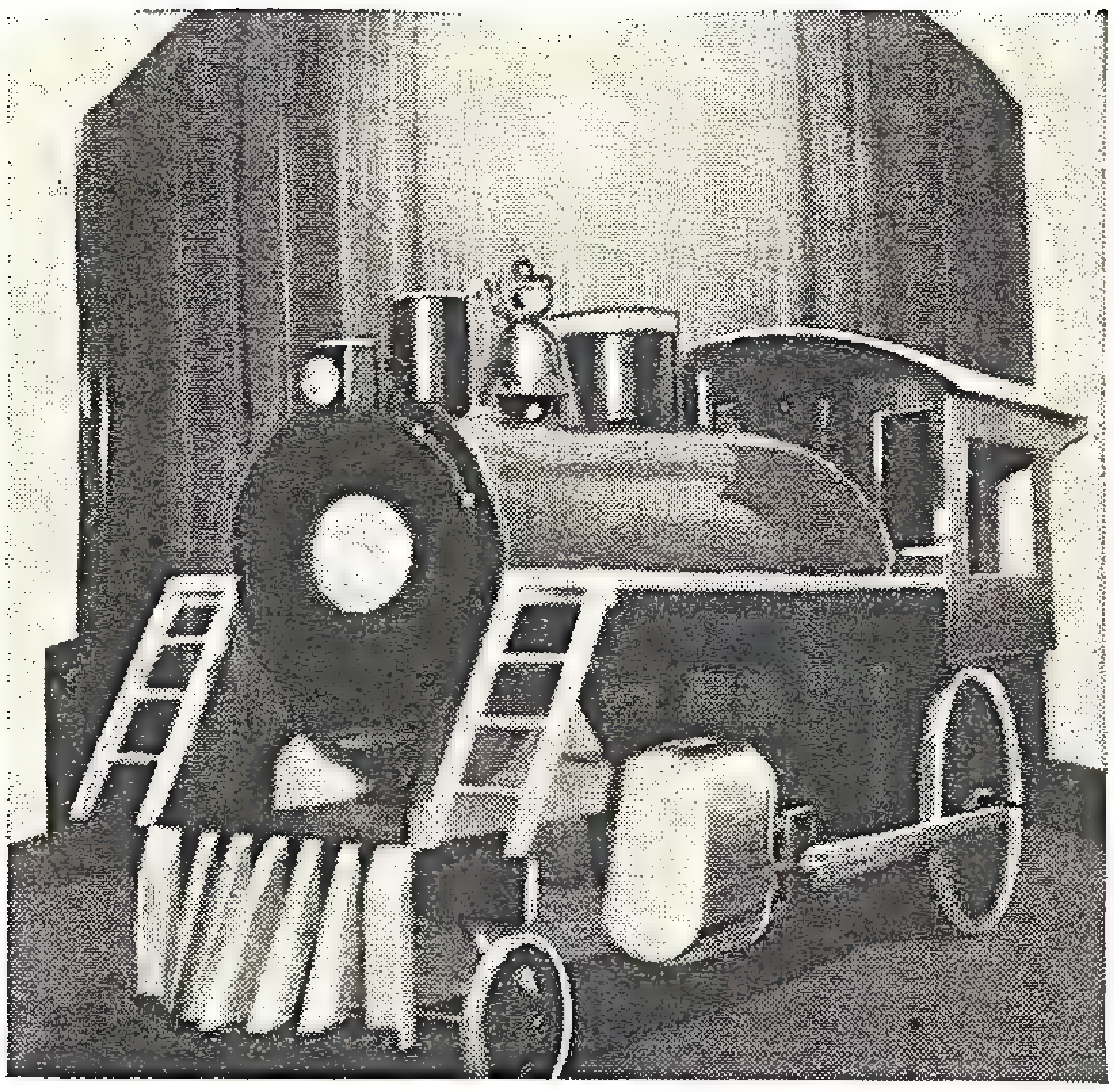
The midget racer is 64 inches long, has brakes, clutch, gearshift, etc., and is powered by an outboard engine. It will attain speeds up to 50 m.p.h.

J. R. Halley.

The arrangement of the outboard engine to power Halley's midget is novel, and we must confess that it really is one of the smallest racers we have ever seen.



A real midget racer, as can be judged from the tiny tot occupying the cockpit, is this one built by J. R. Halley, of Philadelphia, Pa. Note arrangement of its outboard power unit.



Lucky are the youngsters who have fathers who can build them a pedal locomotive like this one. Orville W. Odle, of Hartford City, Ind., built this realistic engine from MM plans.

On behalf of the Auckland Model Airplane Club, Winston B. Mackley, of 8 Ascot Lane, Remuera, SE 2, Auckland, N. Z., wishes to invite correspondence with MM readers who are serious model builders.

The Auckland Club, as many readers will recall, sent a team over to the U. S. last year to win the coveted Moffett Trophy at the National Contests held in Detroit, Mich. If you are really interested in model plane building here is your chance to correspond with members of a club that rates ace high in the hobby. Enclose a stamped addressed return envelope with your letter to Mackley.

⁂

Another $3 prize winning letter was sent in by Robert O. Lewis, of Troy Hills, N. J., who writes:

Dear Editor:

I am sending a snapshot of the sail rig for canoes which I made from plans that appeared in MM. The entire cost was less than seven dollars.

I used the rig to outsail two other canoes that featured different types of rigs. Contrary to the general belief that a canoe is dangerous with sail, I find it unusually stable, due of course, to the lee-boards that are used when sailing. I cannot give this rig too much praise and heartily recommend it to anyone who has a canoe. There is no end of fun and thrills.

Having been an MM fan for years, I keep all the

[*Continued on page* 26]

THE ONLY MAN

WHO COULD TALK TO THE SUPERINTENDENT

"SOON after I began studying," a student wrote to us the other day, "we had a change in management at our plant. I certainly was glad then that I had decided to study in my spare time. For, thanks to my I. C. S. Course, I was the only man in the organization who could talk to the Superintendent in his own language. As a result, I was promoted over men who had been here many years longer than I."

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Editor's Workbench Chips

[*Continued from page 25*]

Built from MM plans, this canoe sailing rig enabled Robert O. Lewis, of Troy Hills, N. J., to win races against canoes fitted with different rigs. Complete rig cost less than seven dollars.

> issues for reference. My next project will undoubtedly be from MM plans.
>
> Robert O. Lewis.

Funs and thrills aplenty await other canoe owners who build the MM sailing rig recommended so heartily by Lewis.

***

We still receive letters from MM readers requesting us to run articles on the construction of light planes. Much as we would like to do so, the present government restrictions on the flying of home-built aircraft would make the articles of no practical value and, for that reason, we must continue to omit them from the pages of MM. If the restrictions are ever lifted readers can depend on the fact that MM would again take the lead in running such plans.

***

Fortunately, we have been able to lengthen the Workbench this month and a prize of $3 was sent to M. S. Zann, of Bay City, Mich., whose letter reads:

> Dear Editor:
>
> Here is a photo of my snow sled with which I had much fun during the past winter. It is powered by a two-cylinder motorcycle engine.
>
> The body consists of one-inch square yellow pine joined with 3/16th plywood and covered with unbleached, doped cotton fabric. The propeller is made of white pine tipped with linen cloth and doped, weighing four pounds including the hub.
>
> The runners are made of oak and the runner blades

[*Continued on page 28*]

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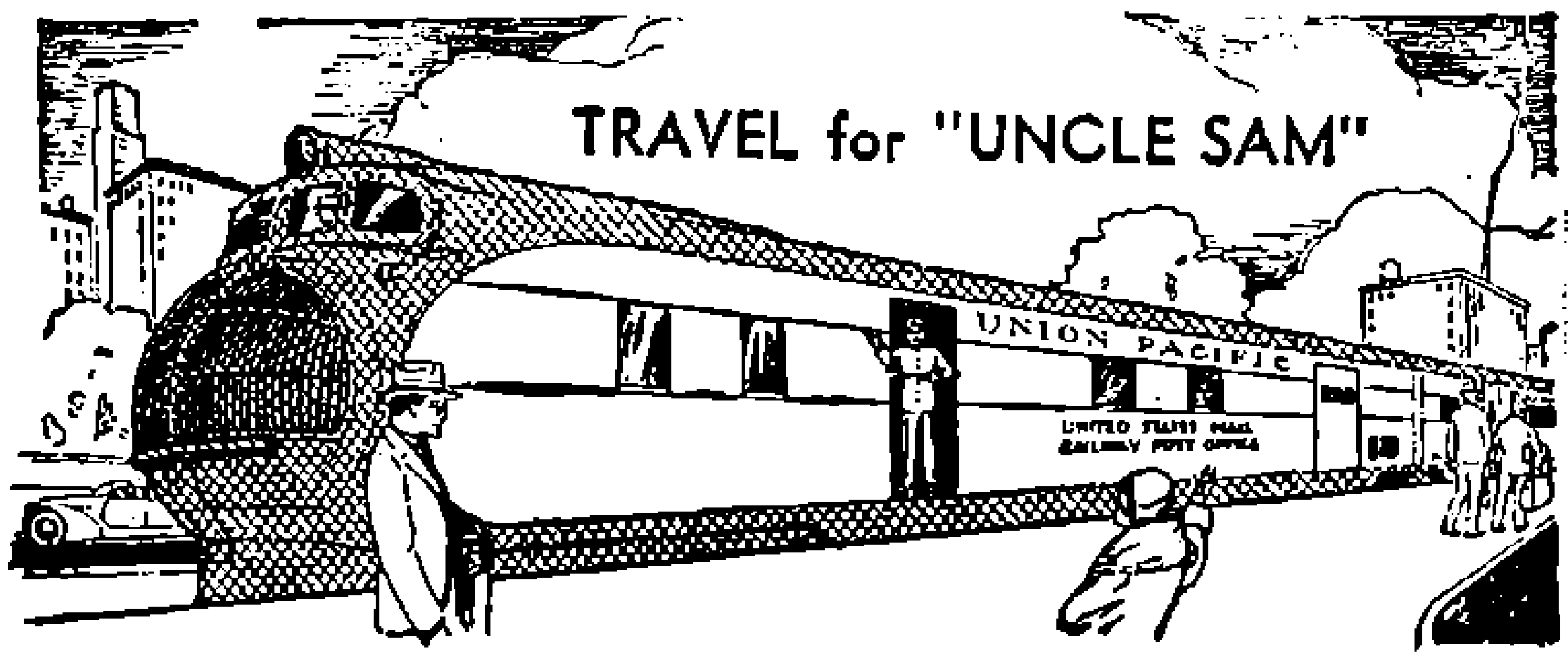

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I would like to look at the five books described above. Send them on your free offer. I will pay the few cents delivery charges only and will examine them thoroughly and return them in ten days unless I like them, in which case I will send you $2.00 and after that $3.00 per month until the total price of only $19.80 is paid. You are also to send me the drafting instruments and consulting membership certificate of the American Technical Society, without extra charge.

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Please attach letter stating age, employer's name and address and that of at least one business man as a reference.

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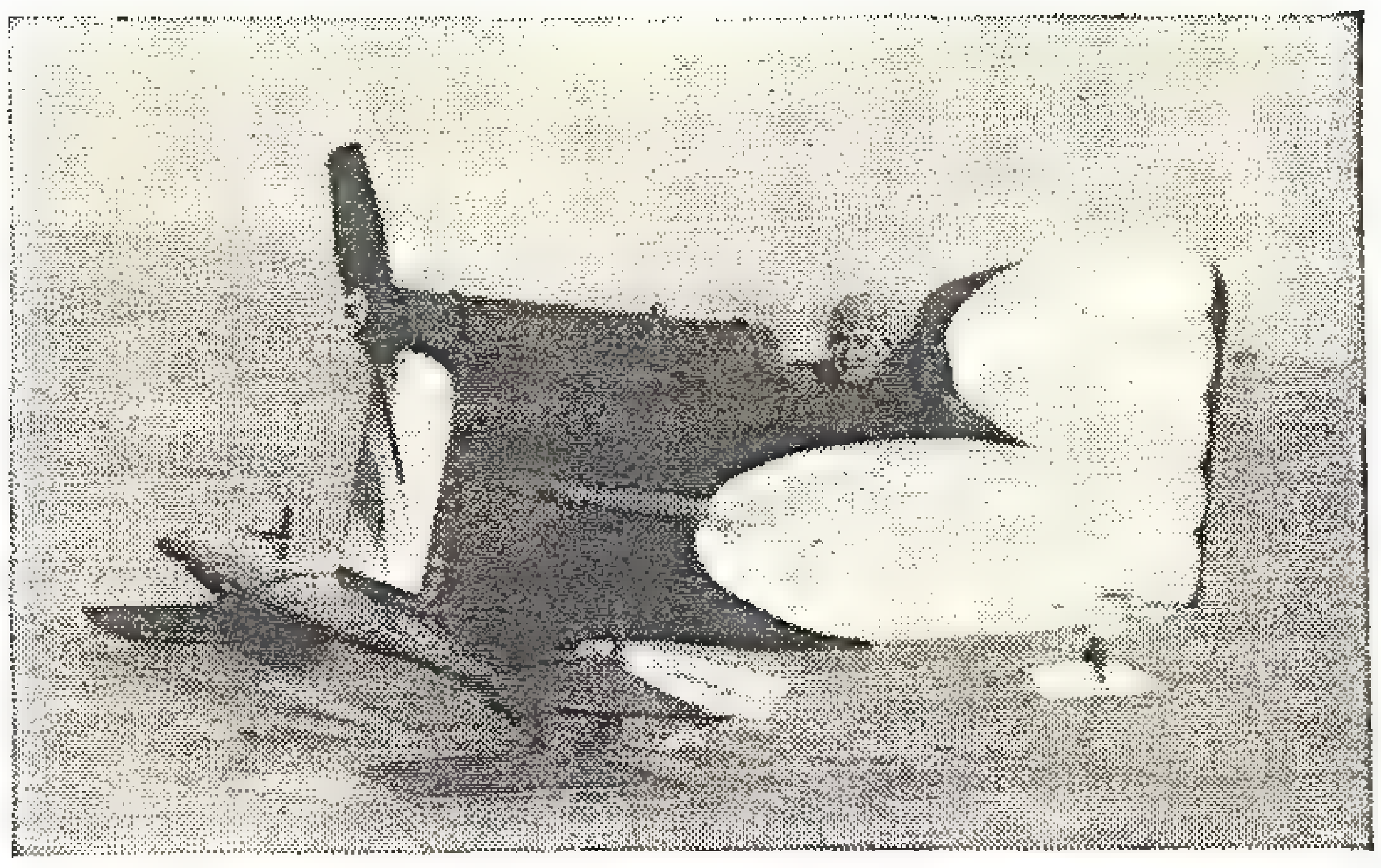
BIG FREE BOOK TELLS ALL!

Editor's Workbench Chips

[*Continued from page* 26]



Powered by a two-cylinder motorcycle engine, this ice sled provided many thrilling moments for M. S. Zann, of Bay City, Mich. Runners have knee action and the big fin aids stability.

are of 3/16th steel. Runners have knee action, steering being accomplished by the rear runner. The big tail fin gives better control at high speeds.

An ardent MM reader for 10 years, I am,

M. S. Zann

Although Spring is almost on us we couldn't resist running the photo of Zann's snow sled. Its streamlining attracts the eye.

***

Readers who would like to exchange news, views, and ideas will find an enthusiastic correspondent in John P. Lowden, of 44 Victoria Park Road East, Cardiff, England, who writes:

Dear Editor:

I am writing to ask you if you can put me in touch with MM readers in other parts of the world who would like to undertake correspondence with me.

Your magazine is excellent, but I would like to see more features in each issue. I especially enjoy the articles on photographic subjects.

John P. Lowden

***

The giant *Queen Mary* ocean liner has intrigued many model builders and to Billy Glenn, of Gastonia, N. C., who sent in a letter and photo describing an excellent reproduction of the liner, MM has awarded a prize of $3. He says:

Dear Editor:

I have been reading MM for several years and think it is the best magazine of its kind. Although I am only 14 years old, I enjoy it and find its plans easy to understand.

I am enclosing a photo of my model of the "Queen Mary" which I recently completed. Why don't you run some articles on crystal radios?

Billy Glenn

The model *Queen Mary* would be a welcome ornament for any club room or den and Billy is to be complimented for constructing it.

[*Continued on page* 152]

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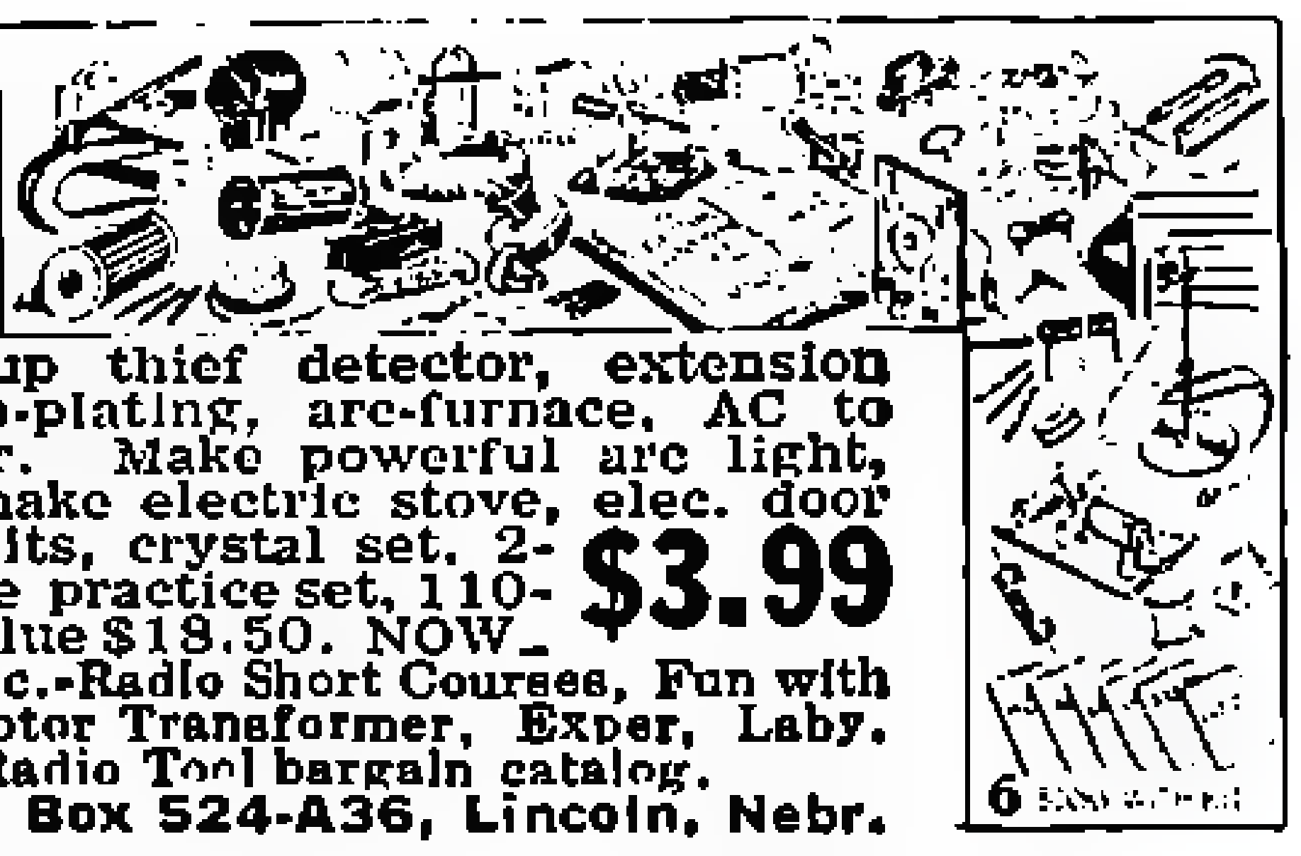

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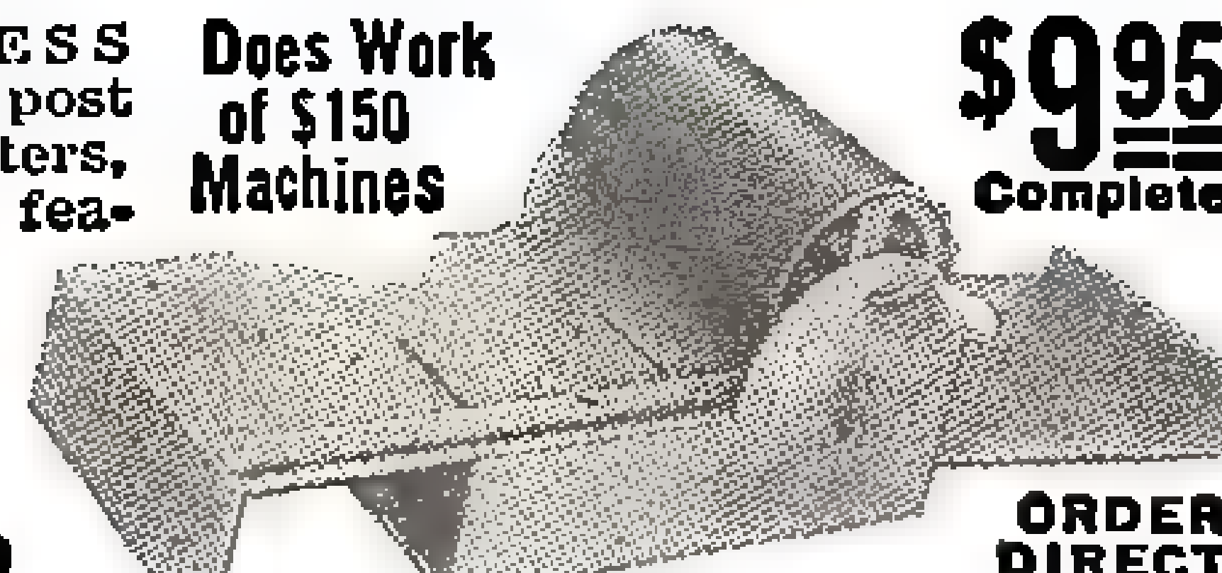

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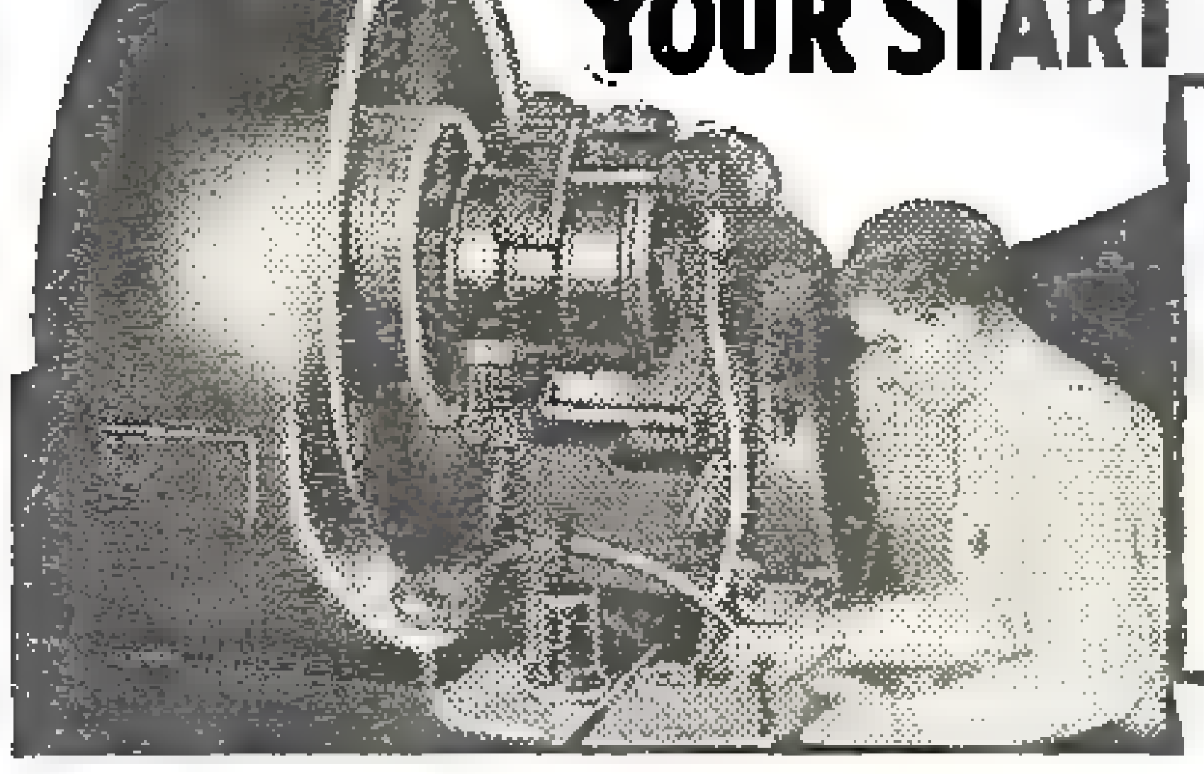

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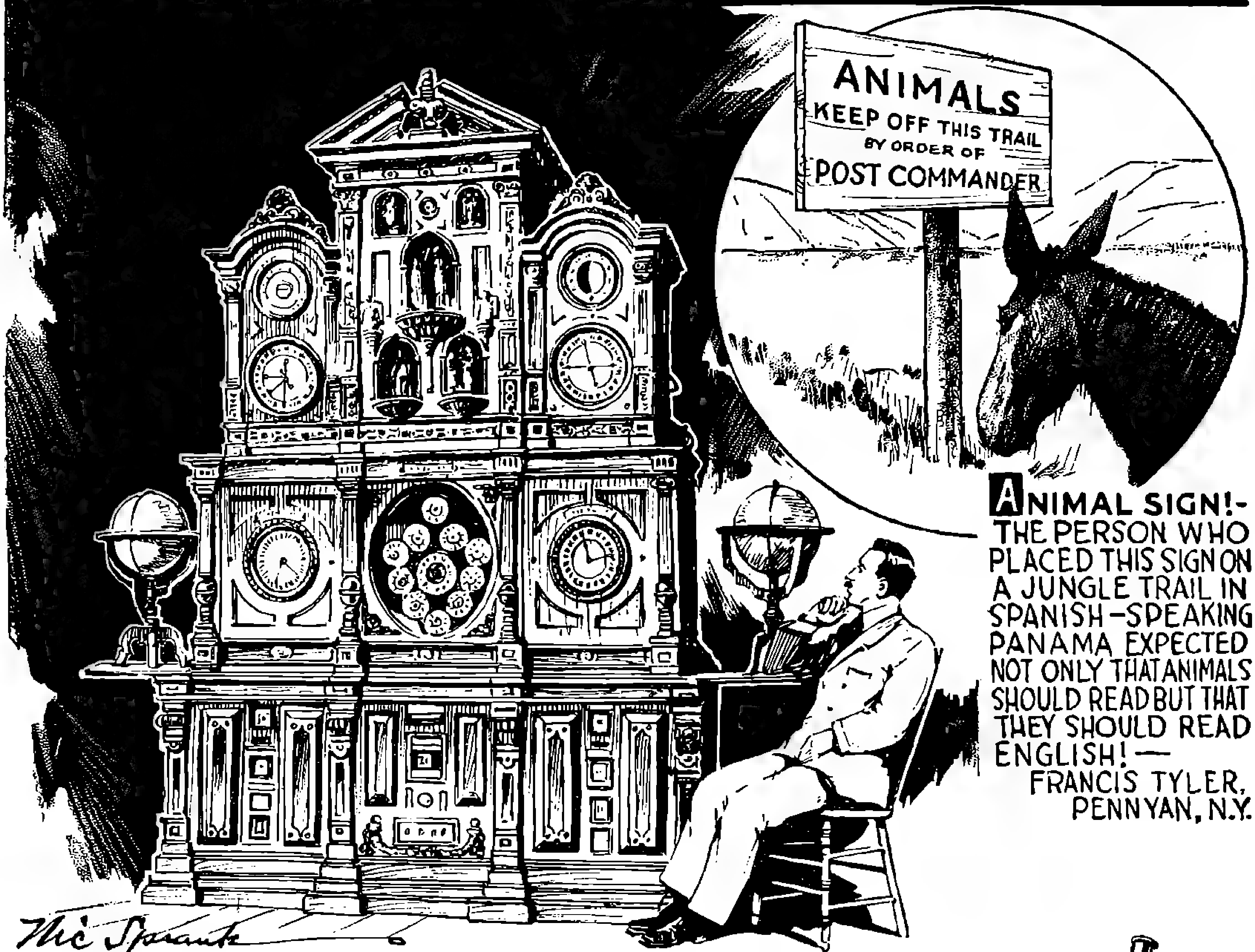
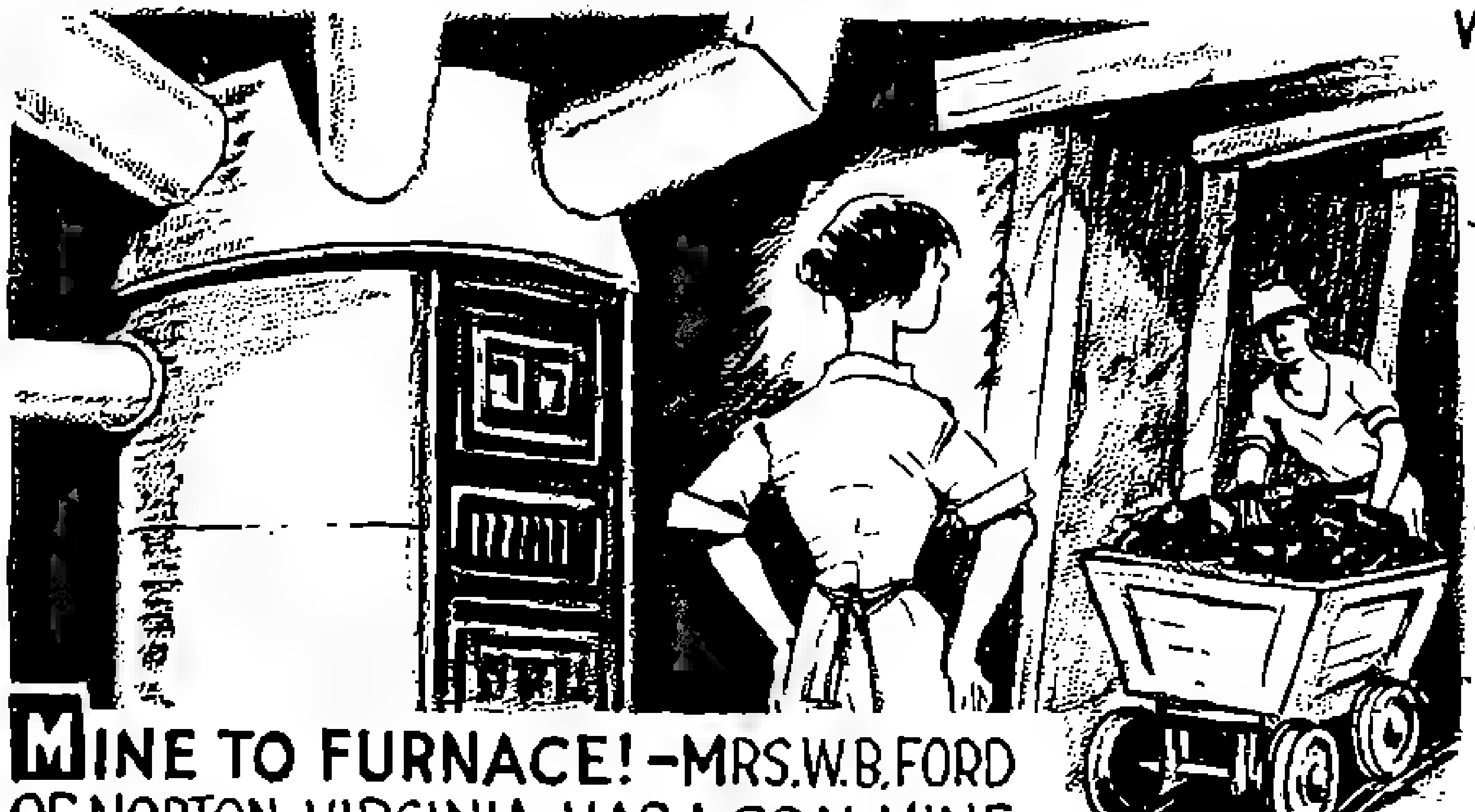
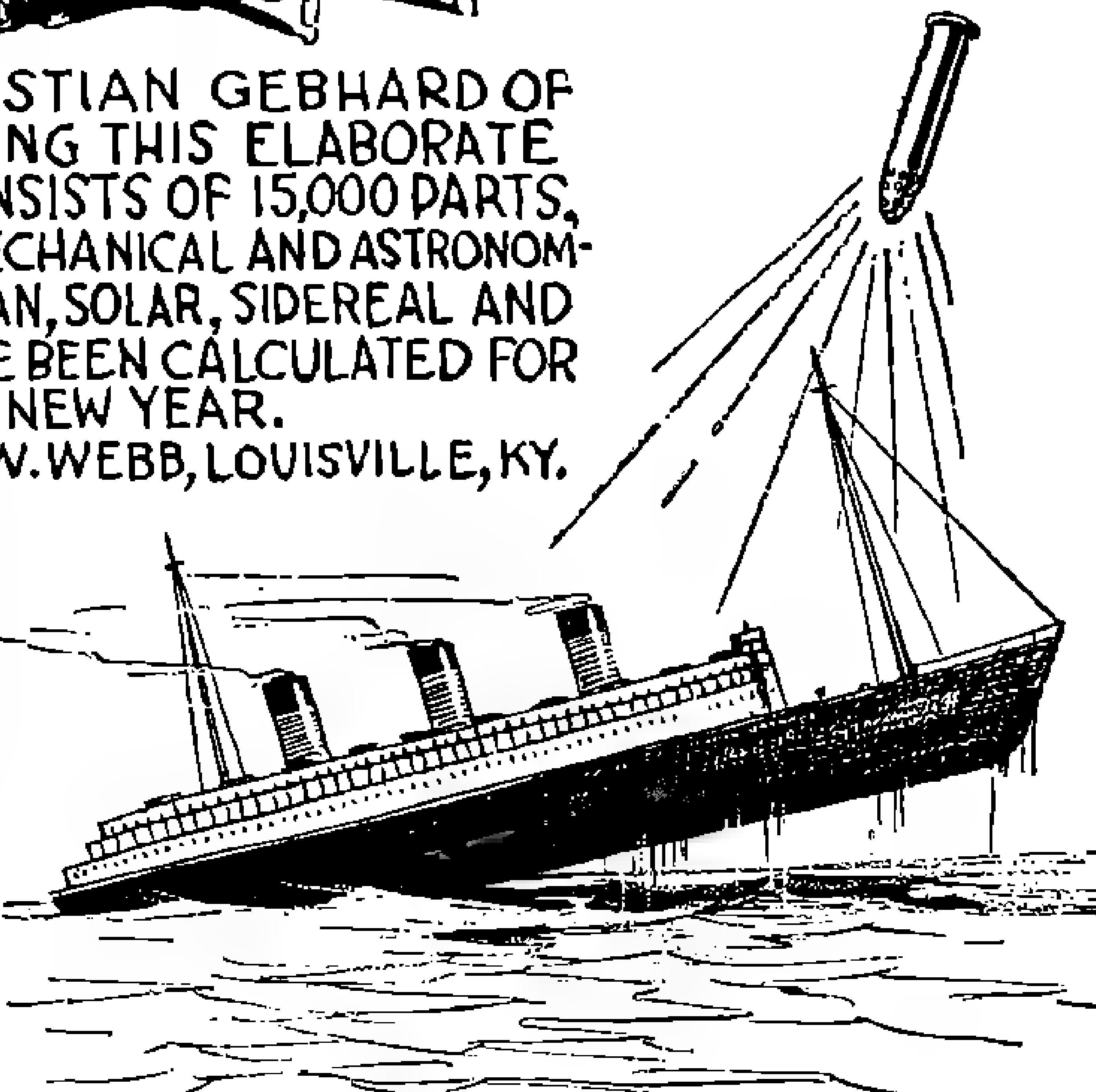


ANIMAL SIGN!—THE PERSON WHO PLACED THIS SIGN ON A JUNGLE TRAIL IN SPANISH-SPEAKING PANAMA EXPECTED NOT ONLY THAT ANIMALS SHOULD READ BUT THAT THEY SHOULD READ ENGLISH!—FRANCIS TYLER, PENN YAN, N.Y.

30 YEARS SPENT IN BUILDING CLOCK!—CHRISTIAN GEBHARD OF GERMANY SPENT THREE DECADES IN CONSTRUCTING THIS ELABORATE CLOCK WITH THE AID OF HIS SONS, L.K. AND R.L. IT CONSISTS OF 15,000 PARTS, WEIGHS 6000 POUNDS AND DISPLAYS 26 DISTINCT MECHANICAL AND ASTRONOMICAL MOVEMENTS, ALL PROPELLED BY ONE WEIGHT. MEAN, SOLAR, SIDEREAL AND DECIMAL TIMES ARE INDICATED. CALENDAR CHANGES HAVE BEEN CALCULATED FOR 300 YEARS IN ADVANCE AND A BUGLER ANNOUNCES EACH NEW YEAR. W. WEBB, LOUISVILLE, KY.



MINE TO FURNACE!—MRS. W. B. FORD OF NORTON, VIRGINIA, HAS A COAL MINE OPENING INTO HER FURNACE ROOM. COAL IS DUG UNDER HER GARDEN AND BROUGHT TO THE FURNACE IN A SMALL CAR.—J. F. DOPACK JR., CHICAGO, ILL.



RADIUM POWER!—GAMMA RAYS EMANATING FROM ONE OUNCE OF RADIUM EQUAL 3,750 HORSE POWER DAYS WHICH WOULD BE SUFFICENT POWER TO LIFT A 39,000-TON SHIP.—CHAS. C. WEIKAL, WICHITA, KANSAS.

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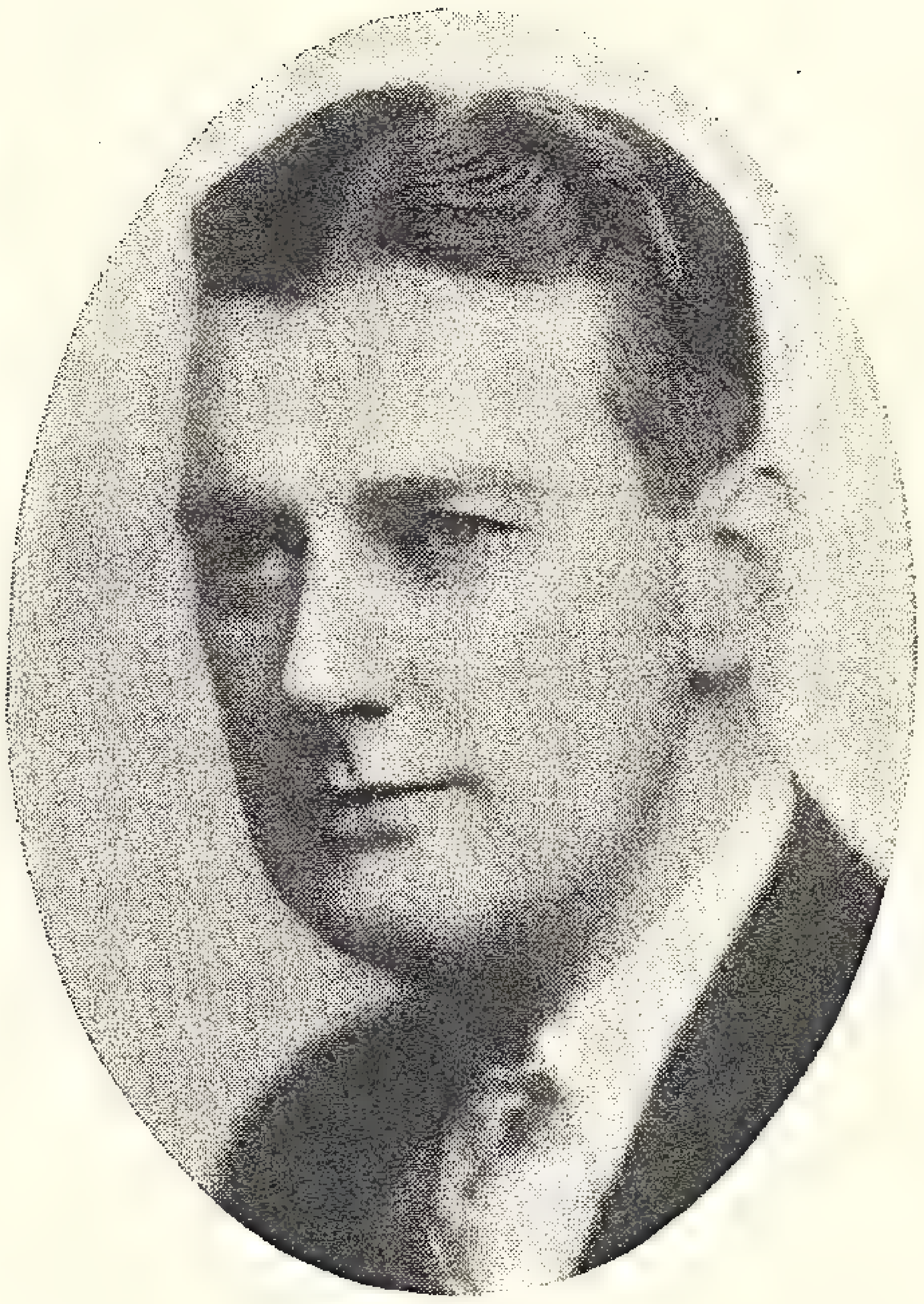
AVIATION'S FUTURE

A Guest Editorial



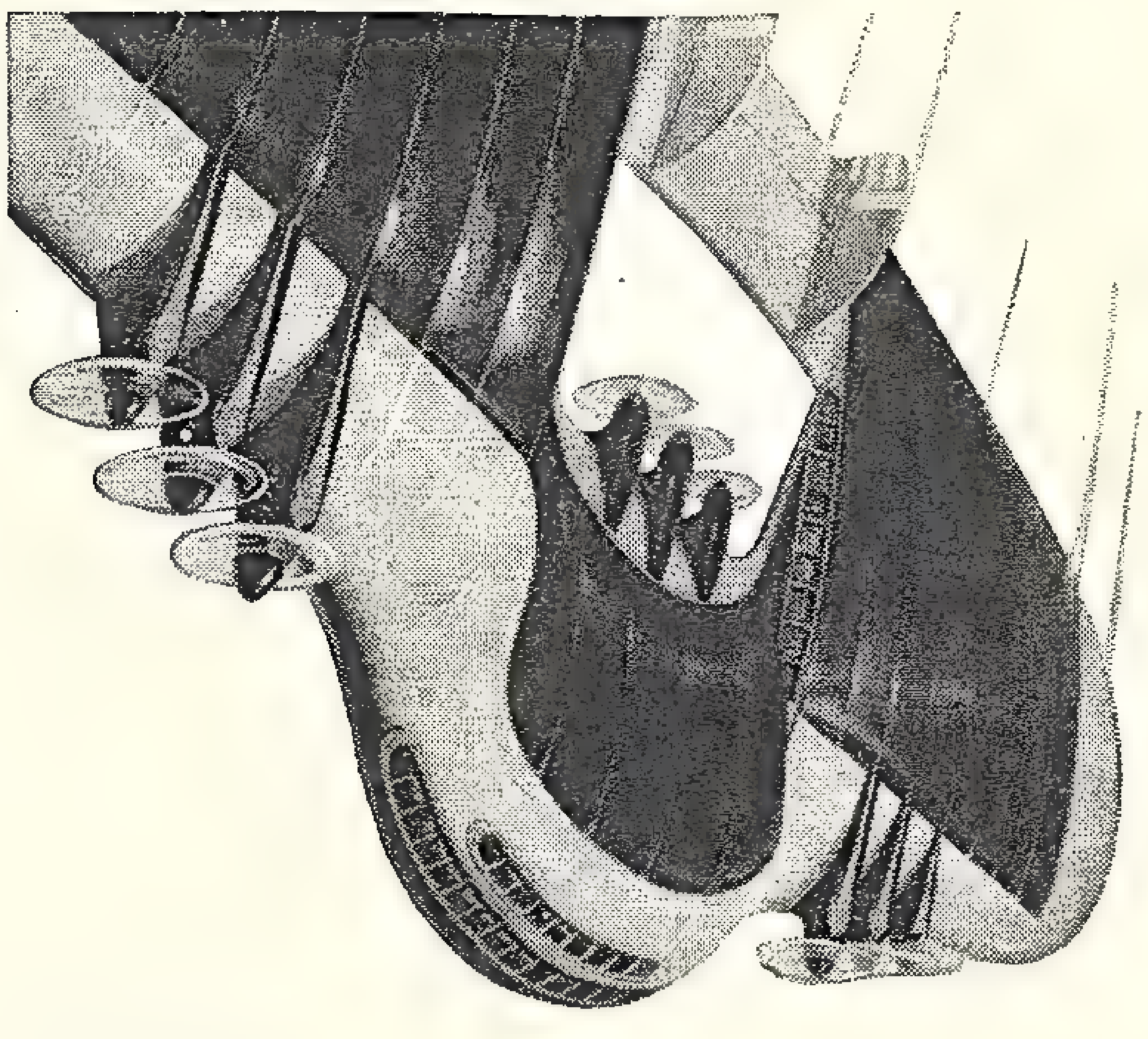
Burdette S. Wright

FOR the immediate future, it seems evident, aviation and the aircraft industry must depend to a great extent upon the operations of air lines for growth and sustenance. This transport business is a cold-blooded economic matter and that means that efficiency of operation will continue to be the main object. As a correlative, greater speed will be sought.

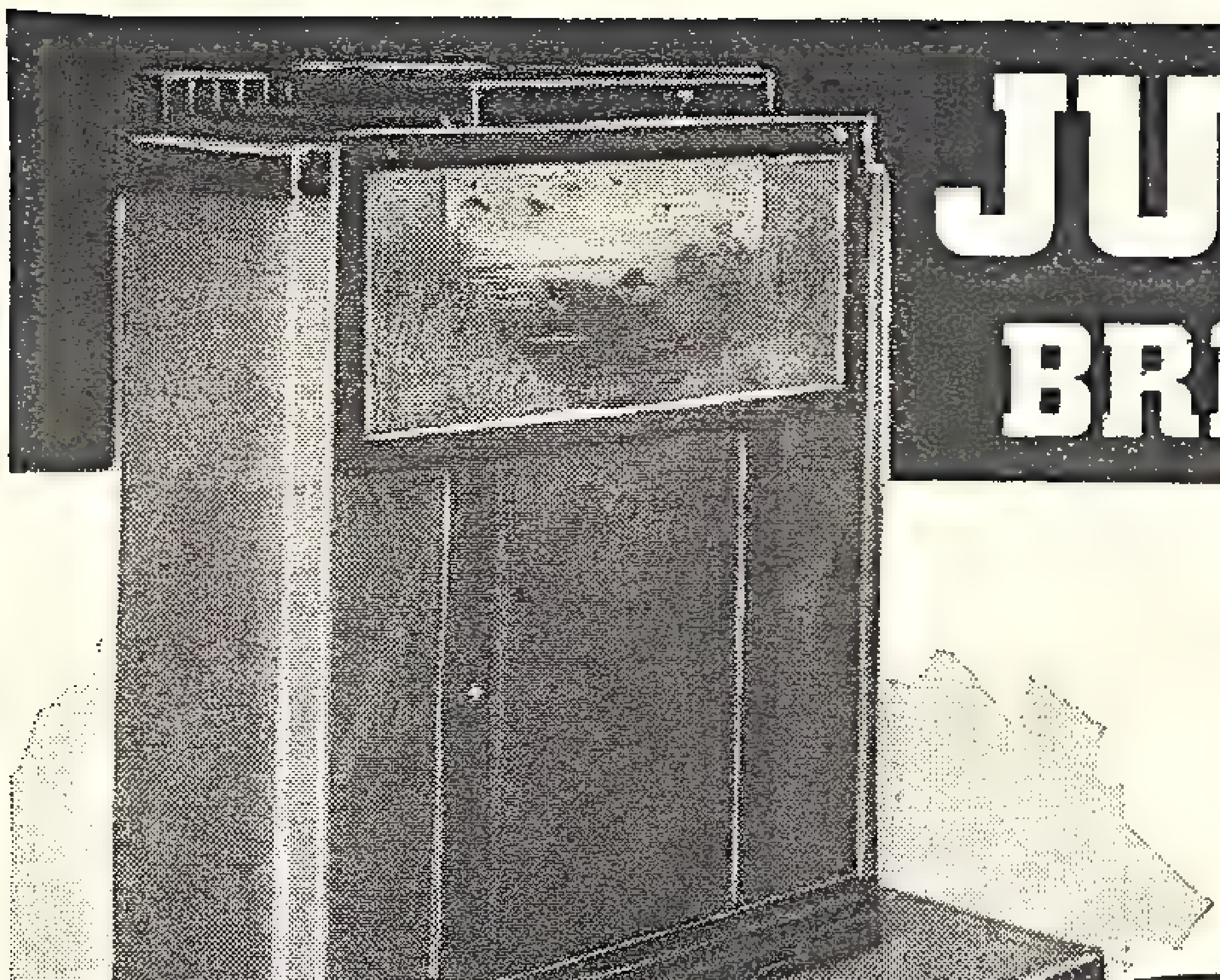
The industry has gone through several years of intense development and improvement of motors and planes. Unless some radical change is made in design, which none of us can foresee now, the next development will be to go to higher altitudes by supercharging the engines in order to take advantage of the lower air resistance offered by the sub-stratosphere. Thus, greater speeds will be possible.

Speed is what we have to sell and development of the controllable pitch propeller and supercharged engines have made sub-stratosphere flying, with its greatly increased speeds, a coming possibility. New planes will be developed which will widen the time-saving gap between airplane and railroad travel. Flying efficiently at 20,000 to 25,000 feet altitude, they will be used principally for trips from either coast to the midwest, or for non-stop transcontinental hops. Because of the time involved in gaining and losing altitude between points sub-stratosphere planes would not be practical for shorter flights.

Whatever happens, we in the aviation industry are certain we shall go forward at an amazing rate. Aviation will not be as long in developing as the railroads were. It is aviation we have our money on and we're sure it will win.



Burdette S. Wright
President
Curtiss Aeroplane & Motor Company



JUST Another BRINGS INVENTOR

With her husband and four children on relief, Mrs. Anna J. Greenwich of Chicago sold a hair curling device which put her on easy street. She paid back relief funds and saved her home besides.

by H. H. Slawson

ANOTHER gadget has rung the bell and brought its inventor a fortune. This time it's a 70-year-old grandmother, Mrs. Birdora H. White, of Chicago, who draws the big prize.

After a 20-year struggle for recognition, Mrs. White has sold for $350,000 the exclusive right to the use of a simple little buckle of her invention on overalls and work garments made by one manufacturer. She still holds other valuable rights in the patent.

So simple does the buckle look that judges in the Patent Office at Washington were almost affronted and scornfully asked, "Why bring that in here?"

"Just another buckle," one of them exclaimed as he disdainfully fingered the model and recalled how he had a buckle "just like that" on his jeans 50 years ago.

Attorneys convinced the court otherwise, however, and a patent was granted. Then Mrs. White experienced years of ups and downs, marked by discouraging rebuffs from big industrialists, by expensive promotional experiments, costly infringement fights and destructive price wars in the buckle business.

It was in 1915 that the idea for her buckle first came to Mrs. White. After 15 years as a widowed school teacher with four children to raise, she had started, at 50, to learn the corset business. Within three months she had designed an improvement on a "clumsy" hose supporter.

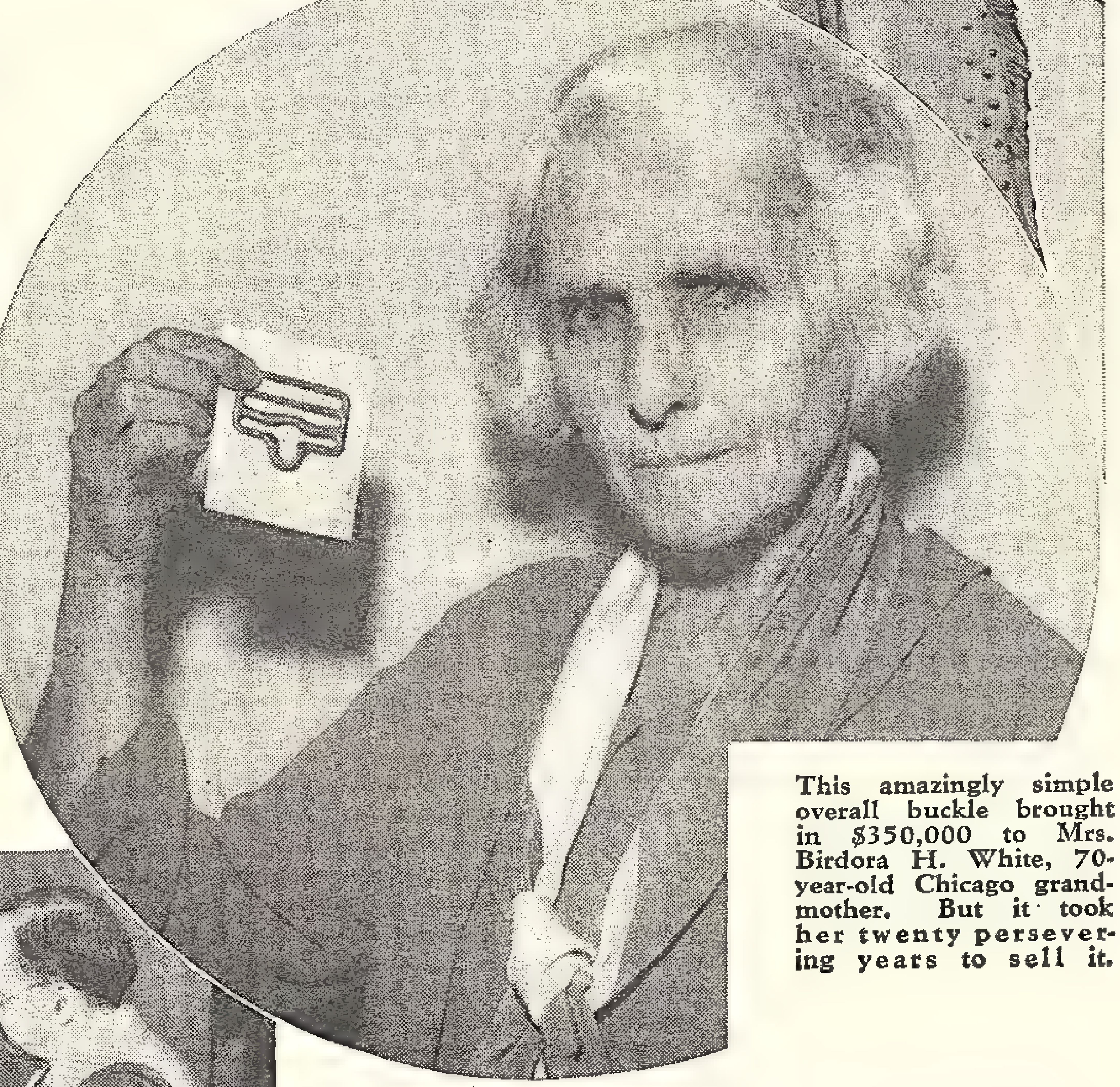
"When I showed

Dr. Vladimir Zworykin with his "bottled television" cathode ray tube. The broadcast pictures appear on the large end, and then are projected onto a mirror.

this to a friend," she relates, "she remarked that it would make a wonderful overall buckle. Then I began noticing how men use bent nails, slivers of wood or big knots to help hold up their overalls. So I started figuring on a buckle suitable for such garments.

"More than once in the discouraging years that followed I was tempted to forget it. I was spending the best part of my life on a little buckle and not getting anywhere. I never see a little gadget now without wondering if the inventor suffered all the grief I went through."

Mrs. White's success is not unusual. The rubber tip on your pencil, the clip on your pen, the rubber-wrapped button on your garters, the snap fastener on your gloves, the zipper on your jacket, that collar button which turns down in the back, your suspenders, your safety razor have all brought Aladdin-like fortunes to their inventors. Gillette, of razor fame, for one, is said to have made $2,500,000 annually, for years.



This amazingly simple overall buckle brought in $350,000 to Mrs. Birdora H. White, 70-year-old Chicago grandmother. But it took her twenty persevering years to sell it.

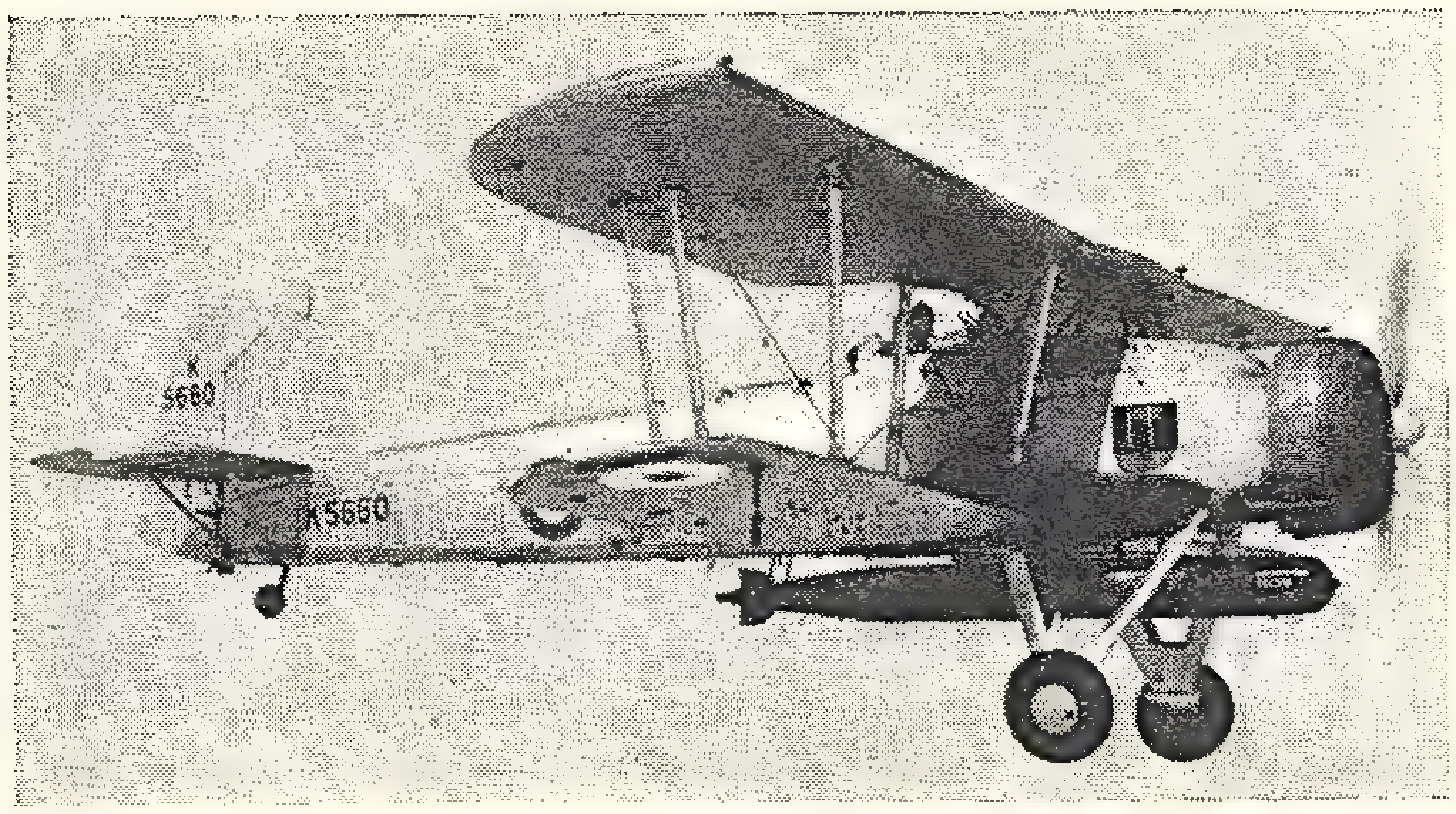
Dr. Willis R. Whitney, who has invented a way to put radio waves to work curing lame muscles and joints caused by hard calcium substance in the body "oil."

Chicago alone, where Mrs. White lives, has been peculiarly prolific in producing outstanding inventors who started in a humble way. One thinks of Pullman and McCormick, of Charles E. Scribner, of the Crane brothers, of William Seelig, Lee De Forest and Vincent Bendix. Almost daily that city's honor roll grows.

From Colorado came two brothers, O. S.

[*Continued on page* 144]

England Equips Navy With Torpedo Plane Fleet



A fleet of Fairey "Swordfish" planes of the type shown above is being built in England to augment the nation's mighty navy. Slung beneath each plane is a deadly 1425 pound torpedo.

ENDEAVORING to increase the attacking power of her mighty navy, England is equipping her Fleet Air Arm with airplanes of a type capable of carrying a 1,425-pound torpedo slung beneath the fuselage. Known as "Swordfish," the planes are powered with 690 H.P. Bristol Pegasus engines.

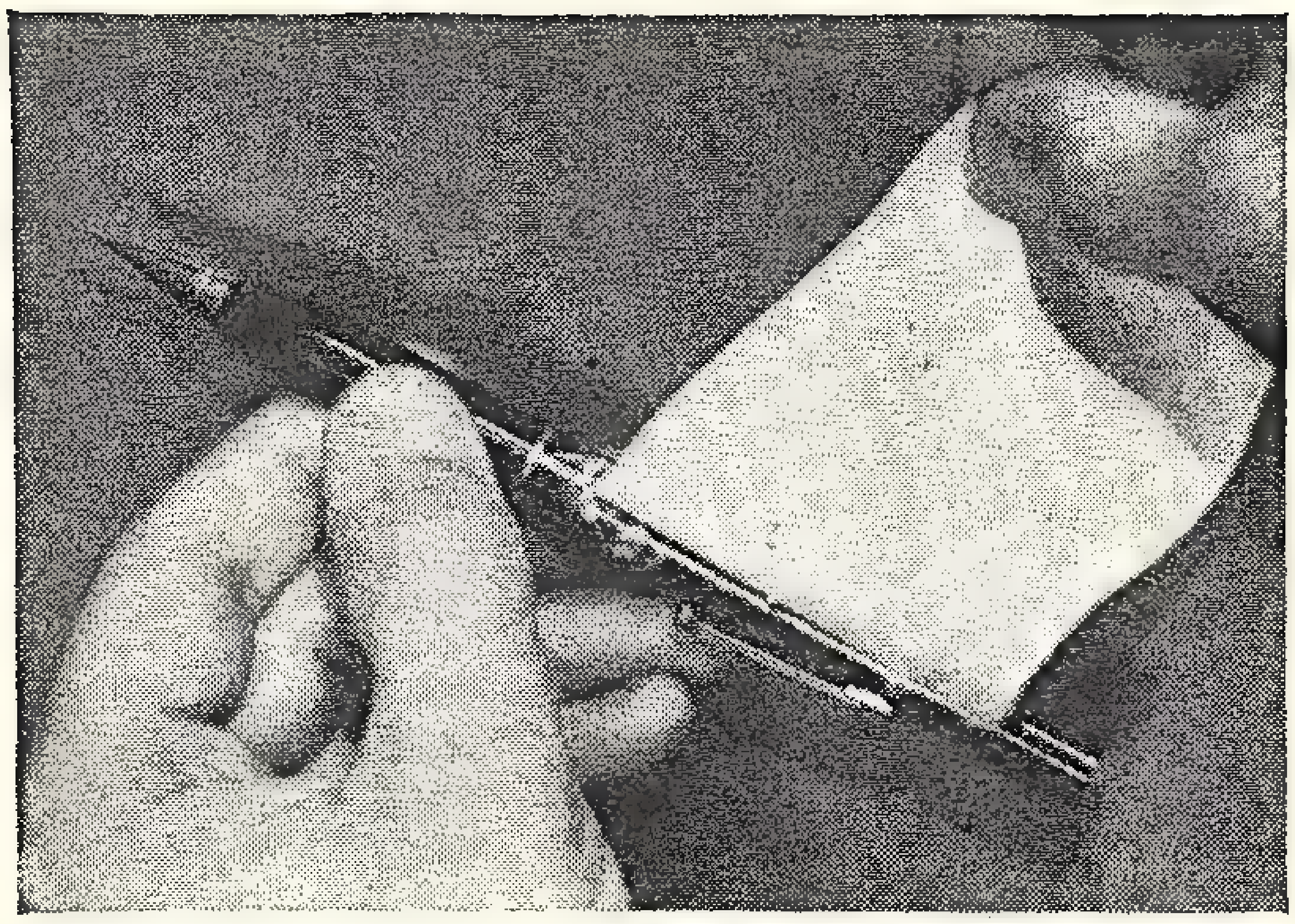
The speed and other performance figures of the torpedo planes are unavailable, being treated as a military secret.

Pencil Holds Memo Paper

CLAIMED to be the first complete writing unit, a new automatic pencil manufactured by a N. Y. City firm, holds a three-foot roll of memorandum paper within its barrel. The paper protrudes from a slit which has a sharp edge to facilitate tearing.

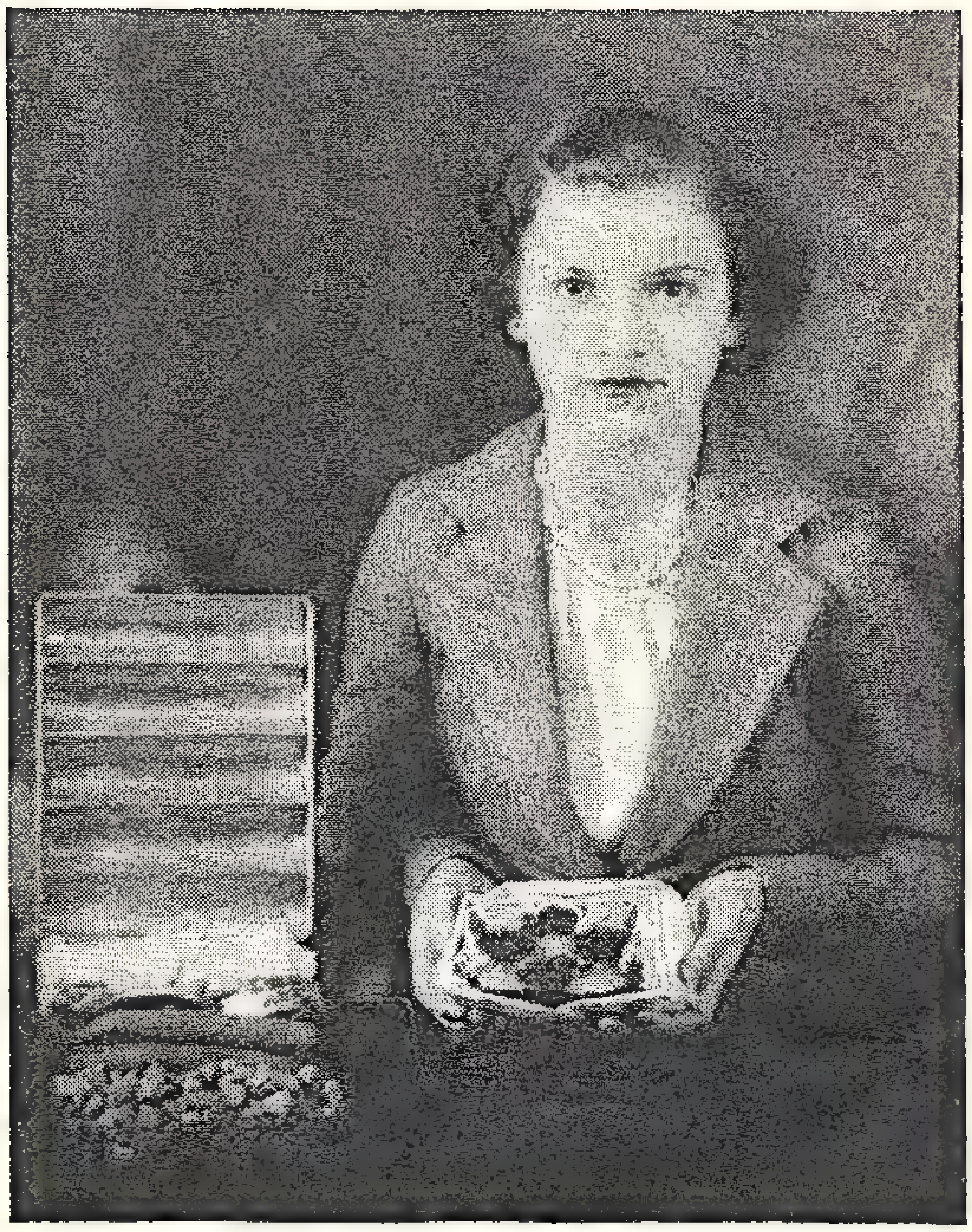
The paper is obtained from the barrel by turning a knob at the top end of the pencil. After the sheet is pulled out as far as desired, the knob is turned in a reverse direction to lock the paper roll. The paper is then torn by pulling it against the sharp edge of the barrel slit.

Paper refills for the pencil are easy to insert, the pencil being held vertical with the point down and the knob turned and pulled upward. This slides the inner paper holder from the barrel. Lead refills are inserted by unscrewing the two sections of the barrel at the center.



This novel automatic pencil carries its own supply of memorandum paper on a roller within its barrel. A quick turn of the pencil top and any desired length of paper is at hand.

Roaster Prepares Full Meal



The cake held by this young lady was baked in the device shown packed with food. Each of the grooved compartments holds a single food, enabling all to be cooked at once.

FEATURING five grooved compartments in which a well diversified meal for five persons can readily be prepared at one time, a double section roaster has been developed by a Buffalo, N. Y. manufacturer.

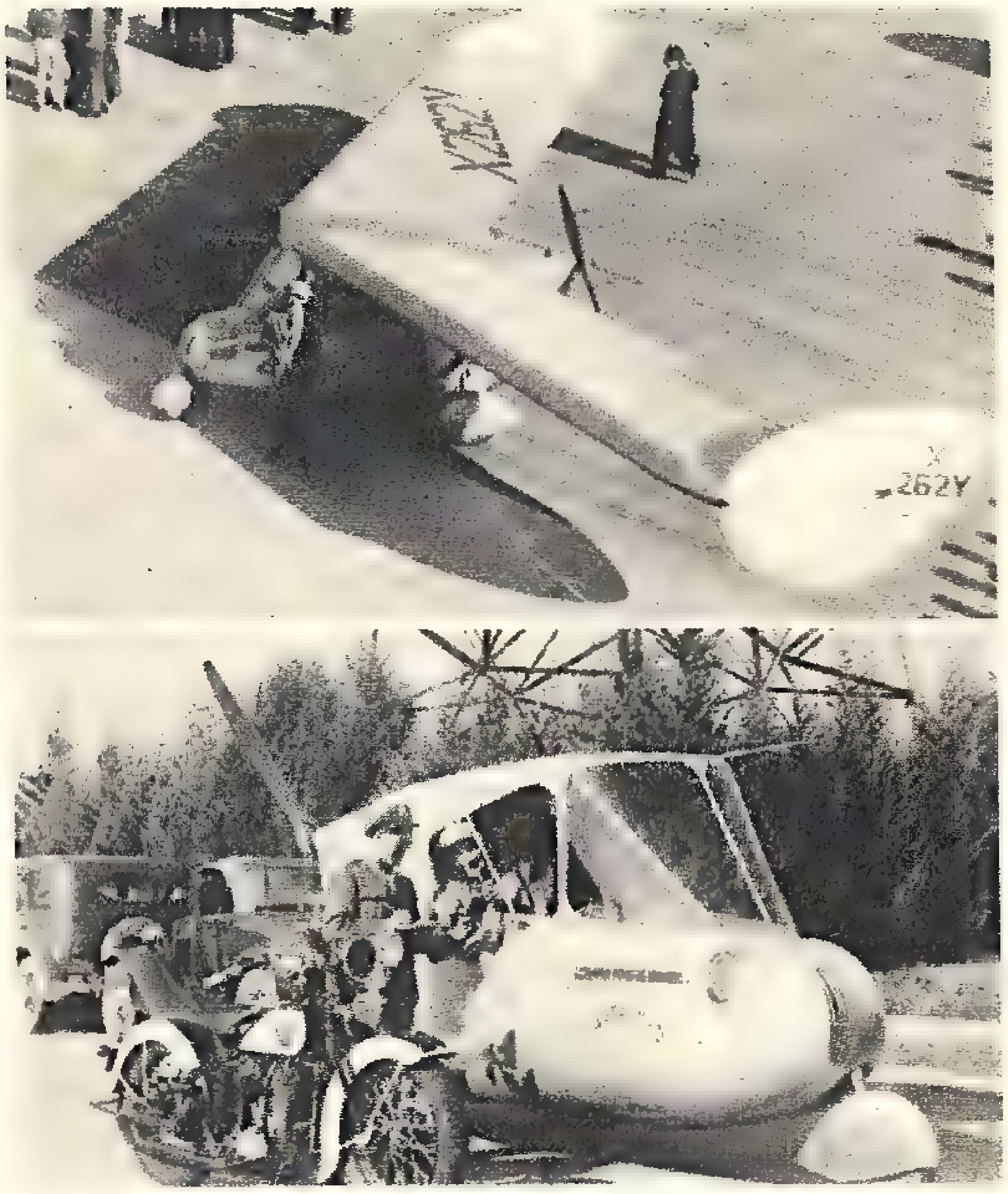
The two sections of the device are exactly alike and separable, fitting together by means of slip hinges and clamps. When closed, the compartments are sealed tight so the aroma of one food does not affect another.

Combination Plane-Auto Enters Low Price Field

A COMBINATION airplane and automobile to be sold in the low price field, has been developed by the Waterman Arrowplane Corporation of Santa Monica, Calif.

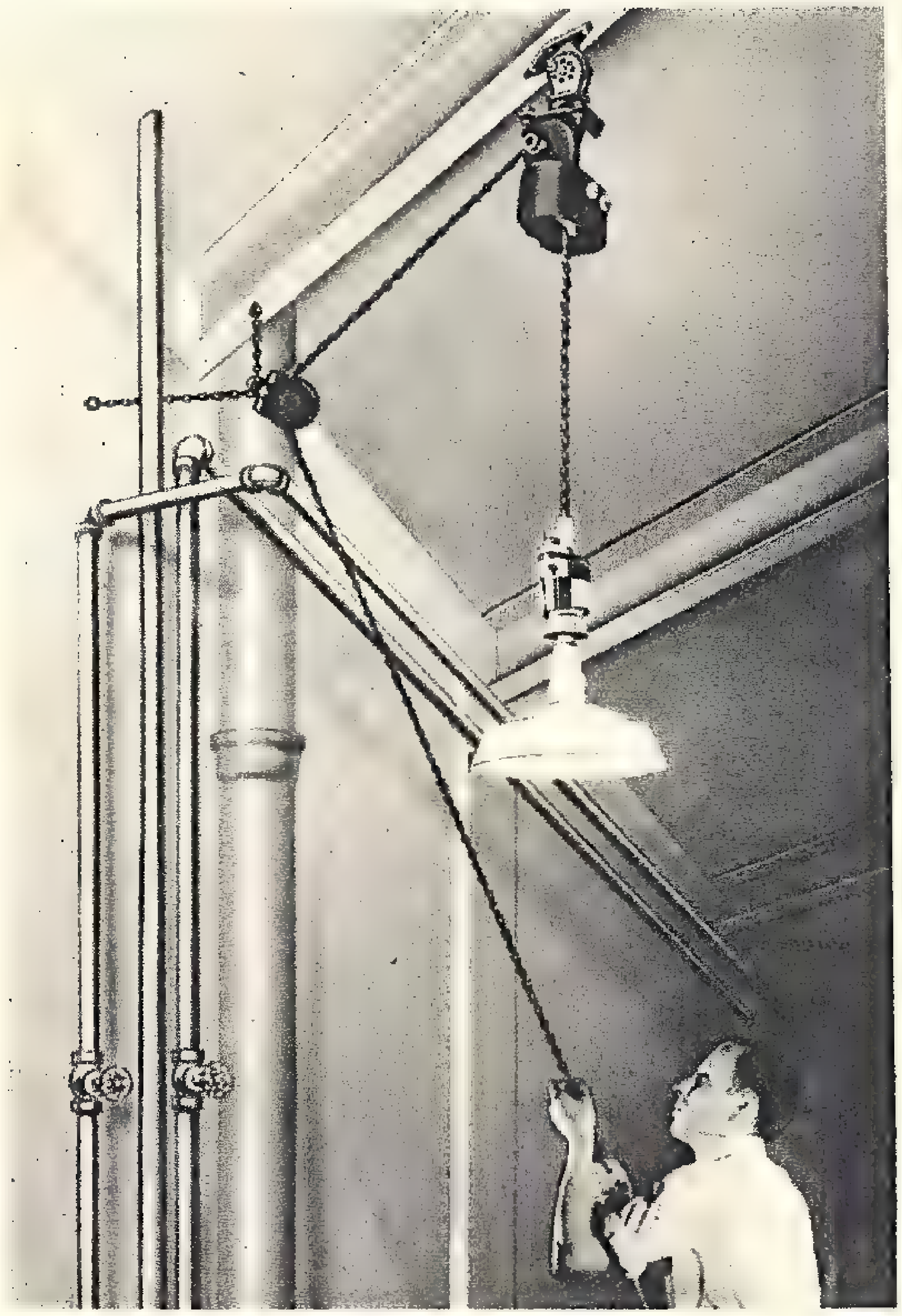
Powered by a six-cylinder Studebaker automobile engine, the plane is so designed that the wings are quickly detachable.

When operated as an automobile, the propeller is declutched and power is transferred to the rear wheels. The plane is capable of a 70-mile-an-hour land speed and a 120-mile-an-hour air speed.



Top—New Arrowbile ready to fly. Below—Wings detached and ready for operation as an automobile. Using a Studebaker engine, the vehicle is capable of a 70-mile-an-hour land speed.

Quick Replacement Of Lamp



Eliminating electrical and climbing hazards, this lamp fixture permits worker to lower lamp away from electrical circuit. Pulled up into position, lamp automatically latches into circuit.

TO ELIMINATE electrical and climbing hazards when cleaning or replacing high industrial lamps, a Cleveland, Ohio, inventor has devised a hanger fixture to lower the lamp away from the electrical circuit.

To latch the lamp into operating position, the lamp is raised until its lower member contacts the upper one. To lower, the operator, with one pull, releases the lamp.

Rubber Fills Tree Cavities

A NEW form of tree surgery employing rubber to seal up cavities after decayed wood is removed, has been developed by George Van Yahres, well known eastern tree expert.

Of specially compounded rubber, it provides a simple but permanent seal against air, moisture and insects. Flexibility of material permits swaying and twisting with the tree without cracking.

Rubber strips seal cavities in trees after decayed portions are removed, resulting in a permanent seal against air, moisture and insects. Flexibility permits sway and twist without cracking.

Building LILLIPUTIAN

William Pinter, of Garwood, N. J. (circle), proudly exhibits his Tiny Tom 00-gauge locomotive and tender built from MM plans. The popular model is patterned after a Southern Pacific Railroad engine.

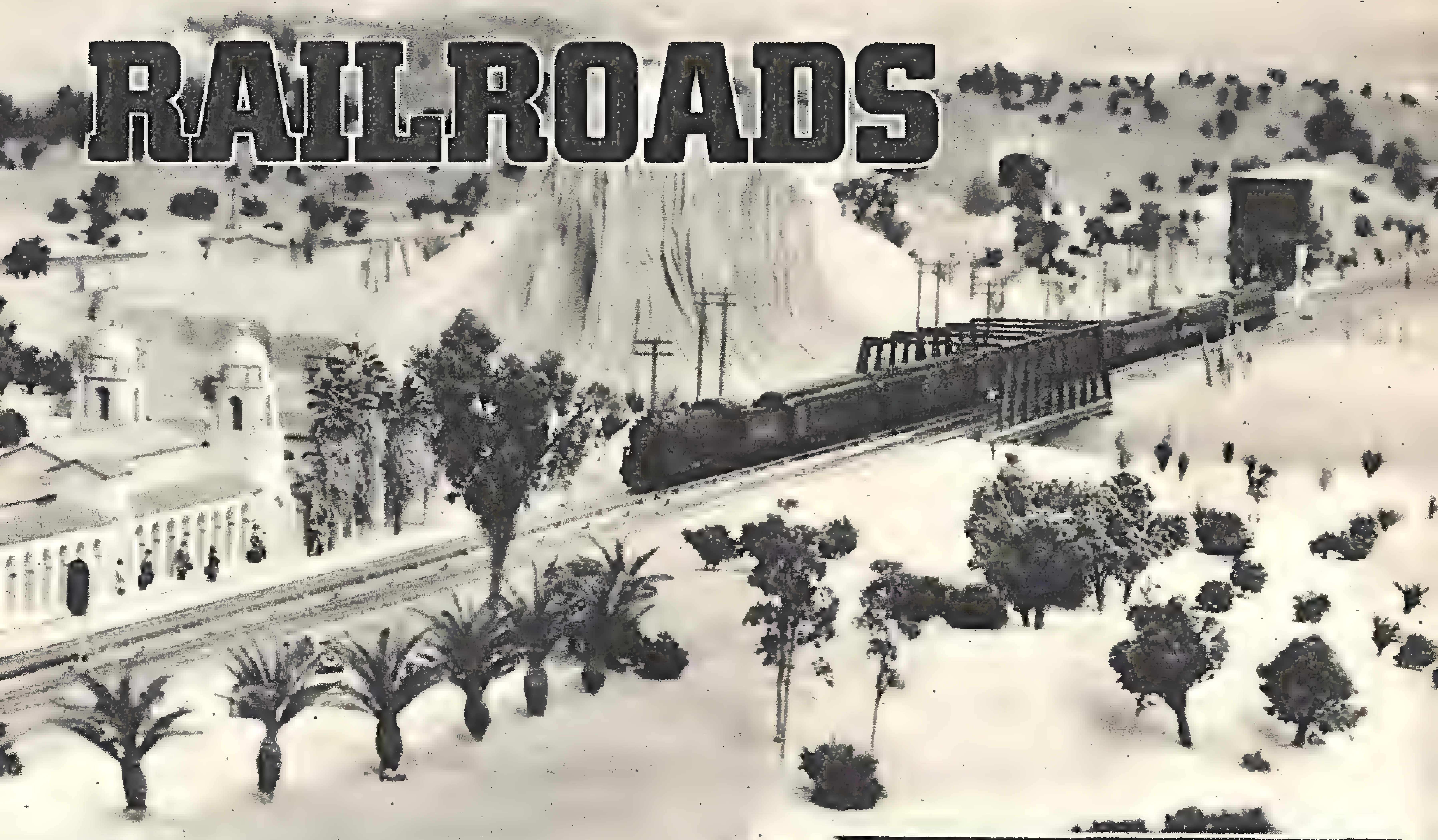
No Child's Play Is This Fascinating Hobby, But a Challenge of Ability.

by A. C. Kalmbach

"PLAYING with trains," is what people used to call it, and playing with trains is what some people still call it until they see a real model railroad system and realize the study and planning, the vast amount of detailed mechanical and electrical work, and the craftsmanship that are necessary to build it.

For model railroading is no child's play, but a full fledged hobby, worthy of the best spare time efforts of the 25,000 or so Americans engaged in it. Perhaps it's the very challenge to their abilities that makes this pastime so popular. A model railroad is never finished, and the better the builder's work becomes the further his ambitions surge ahead of his accomplishments. Machinists, electricians, and engineers are not the only ones who tackle the problem of reproducing to exact scale railroad equipment and railroad operations. By far the largest part of these 25,000 model railroaders are bankers, lawyers, executives, office men, and clerks who never met a hand drill face to face before. To them soldering was a mystery, scaling plans something to be left to the draftsman and architect, and the

RAILROADS

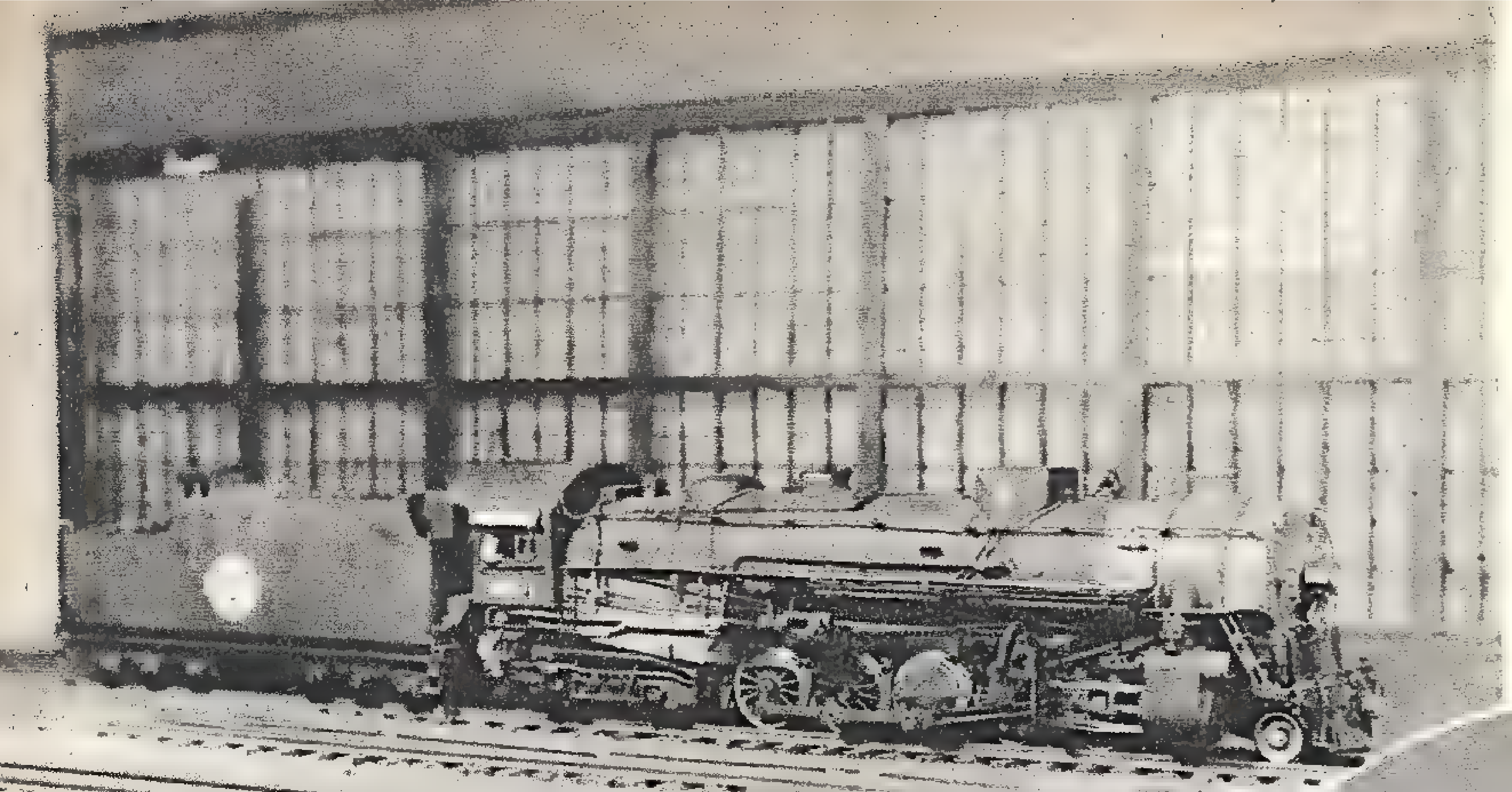


A general scene (above) on one of the 0-gauge systems built by Minton Cronkite, of San Marino, Calif., who has the largest individually owned model railroad in the U. S. So realistic is the system that the Sante Fe Railway borrowed it for display purposes at the Texas Centennial Exposition. Right—Like a view from a signal tower is this stretch of "pike" as seen from overhead.

railroad merely a way of getting somewhere quickly.

Model railroading was popular in England even before the war, and while a few Americans had built scale models of one kind or another before that time, it was not until 1927 that the idea of building really comprehensive miniature systems to exact scale was at all practiced in this country. The beginning was in the east, around New York City, and the earliest builders modeled mostly Pennsylvania equipment (until you are a model railroader you never fully realize the individualities of the various large railroads), and to this day Pennsylvania equipment is most used as a prototype.

At first this scale railroading was largely a rich man's hobby. It took either lots of time, or lots of money to buy someone else's



A large freight engine modeled in 0-gauge by William Lenoir, of West Chicago, Ill., is shown at the left. Notice the complete piping detail. The headlight has transparent number plates on each side of the casing. Circle—A realistic railroad scene is presented by these models as they pass each other on a curve.

time. Most of us were too busy making money in 1927-1929 to spend it on hobbies. Then came the depression and a vast increase in leisure time. The fascination of the railroad combined with the allure of the home workshop. One model railroad in a neighborhood started others and the hobby grew like guinea pigs. Since 1934 the growth has been rapid.

The cost limits of a model railroad system are practically indeterminate. A system can be built for a dollar a month. It takes careful planning and lots of work. Systems have been built costing up to $50,000—and there's still plenty of work left on the $50,000 system to add interest and keep the owner busy in his spare time. The total spent in the U. S. on model railroad parts and on completed models is somewhat more than $300,000 a year.

Some of the men early in the hobby, casting about for fresh business opportunities during the depression, started companies which supply plans, castings, machined parts, and now can sell you freight and passenger cars, locomotives, and track in any form, from rough materials to completely finished units that need only installation. The hobby kit is most popular. In this kit the various parts of a locomotive or car are partly finished, so that work left to be done consists only of drilling, tapping, and soldering. The assembly can be accomplished on the kitchen table.

Finished models cost from $45 up for locomotives, from $5 up for cars. The materials for track cost from six cents a foot up. Persons able to afford it often buy much of their material finished and yet lose little if any of the fun, for there is still plenty to do, planning right-of-way, building scenery, arranging schedules of service, signalling, etc.

A model railroad is never finished. It's a lifetime hobby. The man with little money for non-essentials buys as little outside as he can. Rail, spikes, and rail connectors are his track materials. He makes his own ties. Castings for a few parts, wheels, couplers, gears, and motors are about his only purchased materials for rolling stock. Very often he turns out finer work than the best professionals, just because he can afford to put

Two box cars built by John Borges, of Boston, Mass., are shown below. Perfect replicas of freight cars, they are for HO-gauge, the smallest size used.

Live steam for model locomotives has its fascination although most miniature systems are electrically powered. The train shown in the photo at right is owned by A. R. Horner, Ahwahnee, Calif. Puffing, it valiantly tackles a steep grade.

plenty of time into his work, and because he takes pride in his craftsmanship. It's the construction angle that intrigues him.

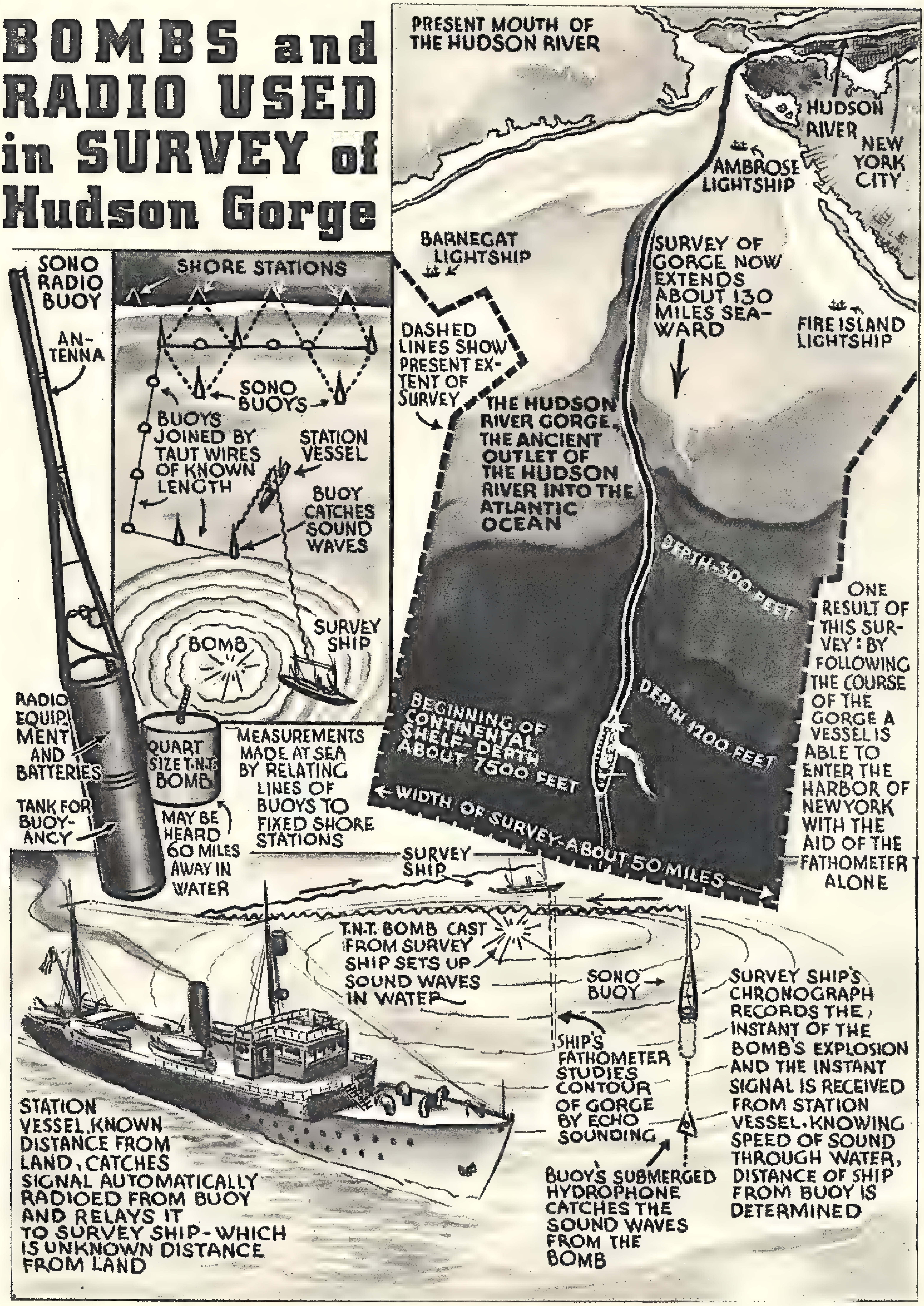
Roughly 90 per cent of the model railroaders are in the kit class, buying their equipment in the shape of finished or semi-finished parts. The remainder are about equally divided between those who buy finished models and those who build from the ground up, buying nothing but the raw materials. These last are the real craftsmen of the hobby. For them one train is an accomplishment, a product of years of labor. Two hundred hours on a locomotive is not unusual. Because of this, they seldom have as complete systems as the men who buy at least some of the parts.

Imagination is important, perhaps paramount, in model railroading. Suppose you want to start a model railroad. You survey the attic, basement, or perhaps back yard with an eye to the possibilities for a railroad route that will move traffic from one place to another, or at least have that appearance. You select a name for your "pike," elect yourself president, chief engineer, and man of all work. You write for catalogs of perhaps a dozen supply houses to get an idea of what each can offer both as to prices, railroad prototype, and quality. You read the model magazines (there are three, one of which is devoted exclusively to model railroading) and see what others are doing so that you

[*Continued on page* 141]

C. F. Robbins, of Keene, N. H., demonstrates pulling power of his scale model Timkin locomotive. It burns coal. Upper photo—A finely detailed 0-gauge model of the famous English "Red Hussar" locomotive.

BOMBS and RADIO USED in SURVEY of Hudson Gorge


PRESENT MOUTH OF THE HUDSON RIVER
HUDSON RIVER
NEW YORK CITY
AMBROSE LIGHTSHIP
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SURVEY OF GORGE NOW EXTENDS ABOUT 130 MILES SEAWARD
FIRE ISLAND LIGHTSHIP
DASHED LINES SHOW PRESENT EXTENT OF SURVEY
THE HUDSON RIVER GORGE, THE ANCIENT OUTLET OF THE HUDSON RIVER INTO THE ATLANTIC OCEAN
DEPTH 300 FEET
DEPTH 1200 FEET
BEGINNING OF CONTINENTAL SHELF-DEPTH ABOUT 7500 FEET
WIDTH OF SURVEY-ABOUT 50 MILES
ONE RESULT OF THIS SURVEY: BY FOLLOWING THE COURSE OF THE GORGE A VESSEL IS ABLE TO ENTER THE HARBOR OF NEW YORK WITH THE AID OF THE FATHOMETER ALONE
SONO RADIO BUOY
ANTENNA
RADIO EQUIPMENT AND BATTERIES
TANK FOR BUOYANCY
SHORE STATIONS
SONO BUOYS
BUOYS JOINED BY TAUT WIRES OF KNOWN LENGTH
STATION VESSEL
BUOY CATCHES SOUND WAVES
BOMB
SURVEY SHIP
QUART SIZE T.N.T. BOMB
MAY BE HEARD 60 MILES AWAY IN WATER
MEASUREMENTS MADE AT SEA BY RELATING LINES OF BUOYS TO FIXED SHORE STATIONS
SURVEY SHIP
T.N.T. BOMB CAST FROM SURVEY SHIP SETS UP SOUND WAVES IN WATER
SONO BUOY
SHIP'S FATHOMETER STUDIES CONTOUR OF GORGE BY ECHO SOUNDING
SURVEY SHIP'S CHRONOGRAPH RECORDS THE INSTANT OF THE BOMB'S EXPLOSION AND THE INSTANT SIGNAL IS RECEIVED FROM STATION VESSEL. KNOWING SPEED OF SOUND THROUGH WATER, DISTANCE OF SHIP FROM BUOY IS DETERMINED
BUOY'S SUBMERGED HYDROPHONE CATCHES THE SOUND WAVES FROM THE BOMB
STATION VESSEL, KNOWN DISTANCE FROM LAND, CATCHES SIGNAL AUTOMATICALLY RADIOED FROM BUOY AND RELAYS IT TO SURVEY SHIP-WHICH IS UNKNOWN DISTANCE FROM LAND

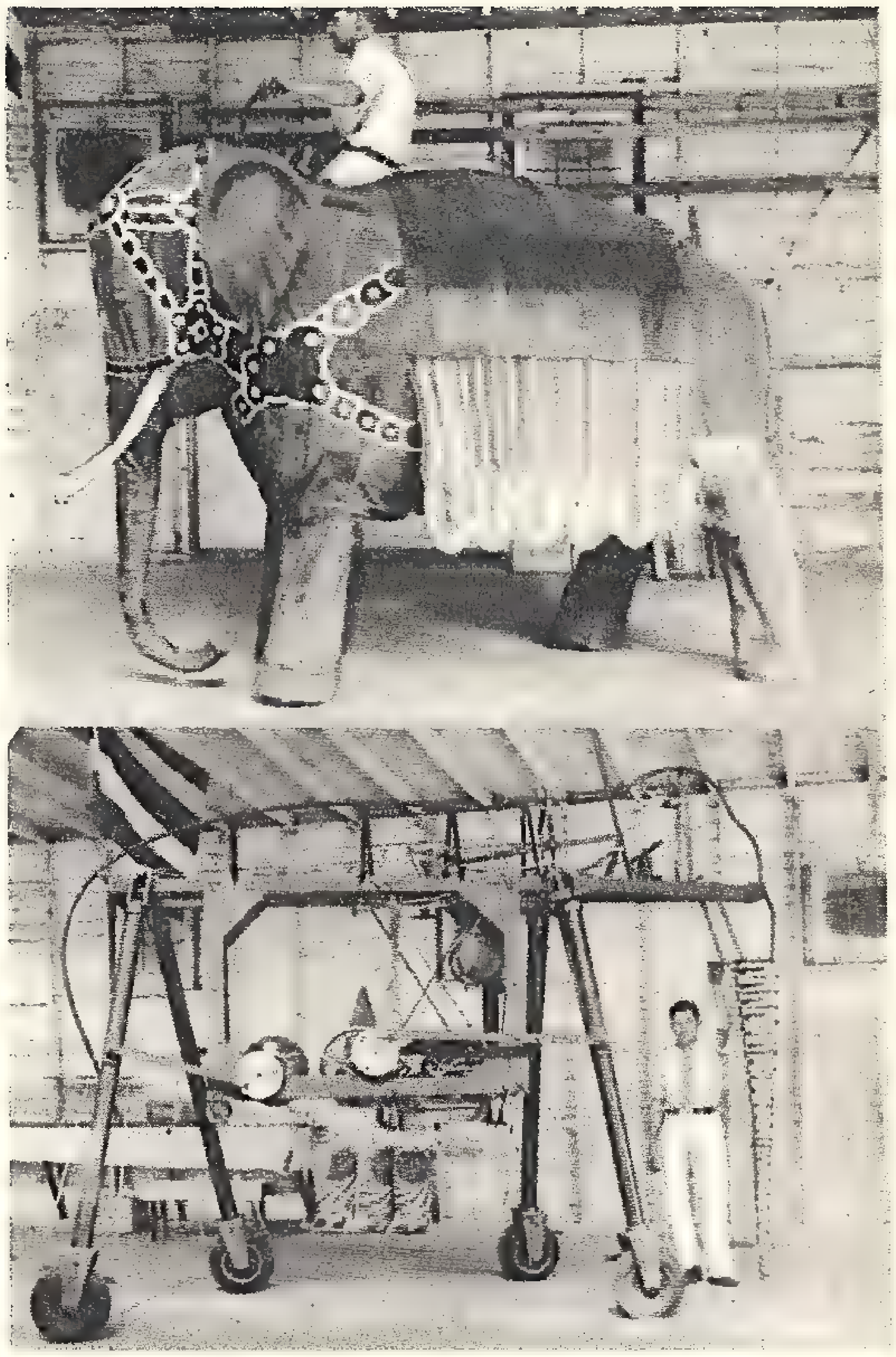
United States Coast and Geodetic Survey vessels completed a hydrographic survey of the outer Hudson submarine gorge approach to N. Y. City's harbor involving 8,290 square statute miles. Over 171,820 soundings were recorded in charting the ancient gash made by the Hudson River in its fall to the ocean. During the spring months, adjacent sections of this interesting coastal feature will be surveyed. Method used in determining depth, width, and course of gorge is graphically shown above.

Mechanical Elephants Walk 500 Miles

USED for advertising purposes, two mechanical elephants constructed by J. G. and George Shrum, brothers, of Miami, Fla., have walked over 500 miles through the principal cities of the state. Both elephants are operated by eccentric gears and travel on rubber tired wheels in a walking motion.

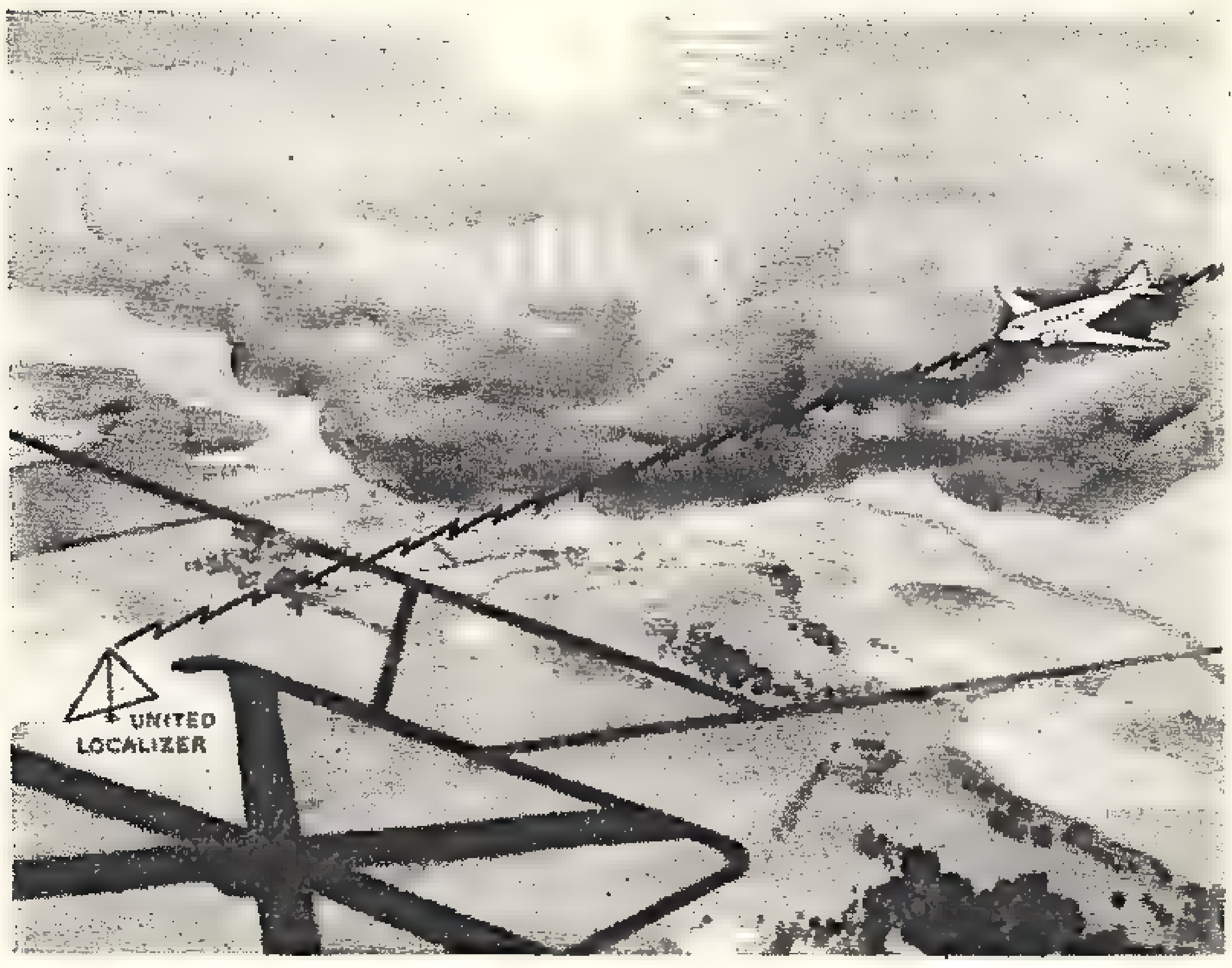
Powered by a single cylinder motorcycle engine, the completed smaller elephant stands 7 feet, 3 inches high, 11 feet long, and 4½ feet wide. Costing $800 to build, it is controlled by a steering apparatus at the base of the head and has a walking speed of 6 m.p.h.

The larger elephant stands 10 feet, 9 inches high, 14 feet long, and 8 feet wide. Powered by a four-cylinder motorcycle engine, it has a walking speed of 7 m.p.h., and cost $8,000 to build.



J. G. Shrum (top), of Miami, Fla., sits atop a mechanical elephant built by himself and his brother, George. Lower photo —George Shrum shows the elephant uncovered. A motorcycle engine, eccentric gears and wheels enable the elephant to walk.

Aero Radio System Devised



This graphic illustration shows the airport localizer radio system developed by United Air Lines engineers. The triangular antenna sends out beams to lead pilots to the airport.

FEATURING a triangular umbrella type antenna that eliminates distortion of the radio beam path caused by weather conditions, a new radio range system has been developed by United Air Lines engineers. It is claimed the system makes positive radio identification of exact airport locations possible.

Serving as an aerial switching system, the United localizer beam intersects the regular airway beam at a point 30 miles from the landing field. Pilots follow its path of radio signals until they are directly over the airport, an invaluable aid in bad weather.

Tractors Launch Life Boats

ELIMINATING the back-breaking work of pushing a heavy life boat over sand, Coast Guard units in the Netherlands are using special caterpillar drive tractors for launching their boats into the surf. Each boat rests atop a metal truck which is pushed into the surf until the boat floats free.

Pushing heavy life boats over sand for launching is eliminated by Netherlands Coast Guard units by using special tractors and trucks to push boats into the surf until they float.

MECHANIZING

by J. R. Robinson

The new Justice Building (above) in Ottawa, Canada, housing the Department of Justice, is also headquarters of the Royal Canadian Mounted Police. From here orders are issued that activate Mounties in solitary outposts in the furthermost reaches of the Canadian woodlands. Major Gen. Sir James MacBrien, commissioner of Royal Canadian Mounted Police (left) introduced airplanes into the service when he became chief over six years ago.

"ARE you able to drive an automobile? Can you use a typewriter? Are you qualified in shorthand?"

Hollywood won't like it known, but those three questions are from the latest recruit examination papers of the Royal Canadian Mounted Police. The days of Reading, 'Riting and Riding, the three R's of the old "Northwest Mounted" are past forever. Hum of R.C.M.P. motors and chatter of R.C.M.P. keys drown out the last clatter of hooves. Not stable fatigues but classes in practical mechanics blight young policemen's hopes of high adventure. The Mounties have gone modern.

Plain figures plainly set down best show what has happened to the riders of the plains and their traditional means of locomotion since the days when a horse for every man and a few

The Mounties

"Get Your Man The Quickest Way," Now Canadian Police Creed.

The modernized R. C. M. P. has 19 speedy power boats, of the type shown above, to combat smugglers. Right—Sketch showing the Mountie as popularly portrayed in fiction. Today, only 300 of 3,000 men are horse-mounted, although all must know how to ride.

spare mounts for luck was the rule of the service. Today, there are in the Royal Canadian Mounted Police 2,500 men, 387 sleigh dogs and 300 horses. The list of R.C.M.P. mechanical transport includes 442 cars, 28 motorcycles, 19 trucks, 19 power boats and one Arctic supply ship. In addition the force uses, in its preventive service on the coasts, a small fleet of Royal Canadian Air Force seaplanes.

Mileages for the last year of record mark even more clearly the eclipse of the horse in the Royal Canadian Mounted Police. The distance traveled on duty in the year was 13,506,632 miles; an average of 5,402 duty miles for every member of the force. Nearly seven million miles of the total was covered by motor, just over six million by railway and steamboat, more than 300,000 miles by coast, lake and river patrol boats, close to 200,000 miles by airplane, 50,000 miles by dog team and not enough miles on horseback to be worth recording.

The force has come a long day's ride since the spring morning in 1874 when 300 redcoated, white-helmeted young horsemen started west from old Fort Garry to carry out the words of the newly created "Mounted." The 300 had enough to do in their day. They had to deal with liquor smugglers, cattle rustlers and horse thieves along 800 miles of boundary, to convince 20,000 short-

Air patrols, made in seaplanes of the Royal Canadian Air Force (above), are part of the routine duties of the mechanized R. C. M. P. Mounties travel about 200,000 air miles yearly. *(Royal Canadian Air Force Photo.)*

Motor cars are used by the Mounties in ever increasing numbers. Nearly seven million miles are covered annually by auto patrols using 442 cars owned by the organization. Photo shows, left to right, Constables Greene, Cooper and Ross of the Regina Town Station.

tempered redmen that the new rails going down across the prairie were better not torn up, to mete justice, fight prairie fires, and generally to guard life, property and the Queen's peace over 2,300,000 square miles of Canada's Northwest Territory.

That task was well done. That day is over. Today, the boundaries the R.C.M.P. patrol run west from Atlantic to Pacific and northward from Campobello Island and Cape Flattery to far beyond the Arctic Circle; the lawbreakers they hunt are more likely to be members of international dope rings than simple horse thieves, and their tasks have multiplied with the years. Reporting on the vagaries of the Aurora Borealis, card-indexing fingerprints in an Ottawa office, tracking an Eskimo killer across 300 miles of ice floe, trailing a smuggler to Spain and back, enforcing Dominion wild life laws, rescuing a flight-weary wild goose from small boys, these are all in the mixed bag of a present-day Mounted policeman's duties. In few of the thousand jobs that may come out of the bag is his old friend, the horse, much use to the Canadian Mountie.

Sir James MacBrien, flying commissioner of the Royal Canadian Mounted Police, who, in 30 days made an 11,000-mile inspection of posts, a trip that once required three years of tedious travel by ordinary surface means of transportation, tried, not long ago, to comfort alarmed romantics among his countrymen. The horse, he said, was still assured of a place in the Mounted Police. There was "no intention whatever of dispensing altogether with the mounted men." The intention was only to segregate horses and horsemen in a mounted section to be used for ceremonial parades and in "dealing with unruly crowds." A "mounted section" in the Mounted Police—*Sic transit gloria equi.* But when lawlessness takes to 12-cylinder engines and short wave radio, the law needs more than hooves and horseflesh to keep up with it.

The force itself sees small cause to lament the mechanization of the Mounties. Getting your man being the essential thing, the quickest way of getting there to get him is the best in R.C.M.P. opinion. That's why the Mounties rode horses in the 'seventies. That's why they ride in motors, power boats and airplanes today, when they aren't driving dogteams across the ice hummocks of the last frontier. The Mounties have been going modern from

The figure of the trooper and his horse (right) is fast reaching the point where it can only be seen blazoned on the covers of magazines and in motion pictures. Not enough miles are covered on horseback by modern Mounties to make the matter worth mention in official reports. Plane, car, and speed boat crowd the scene.

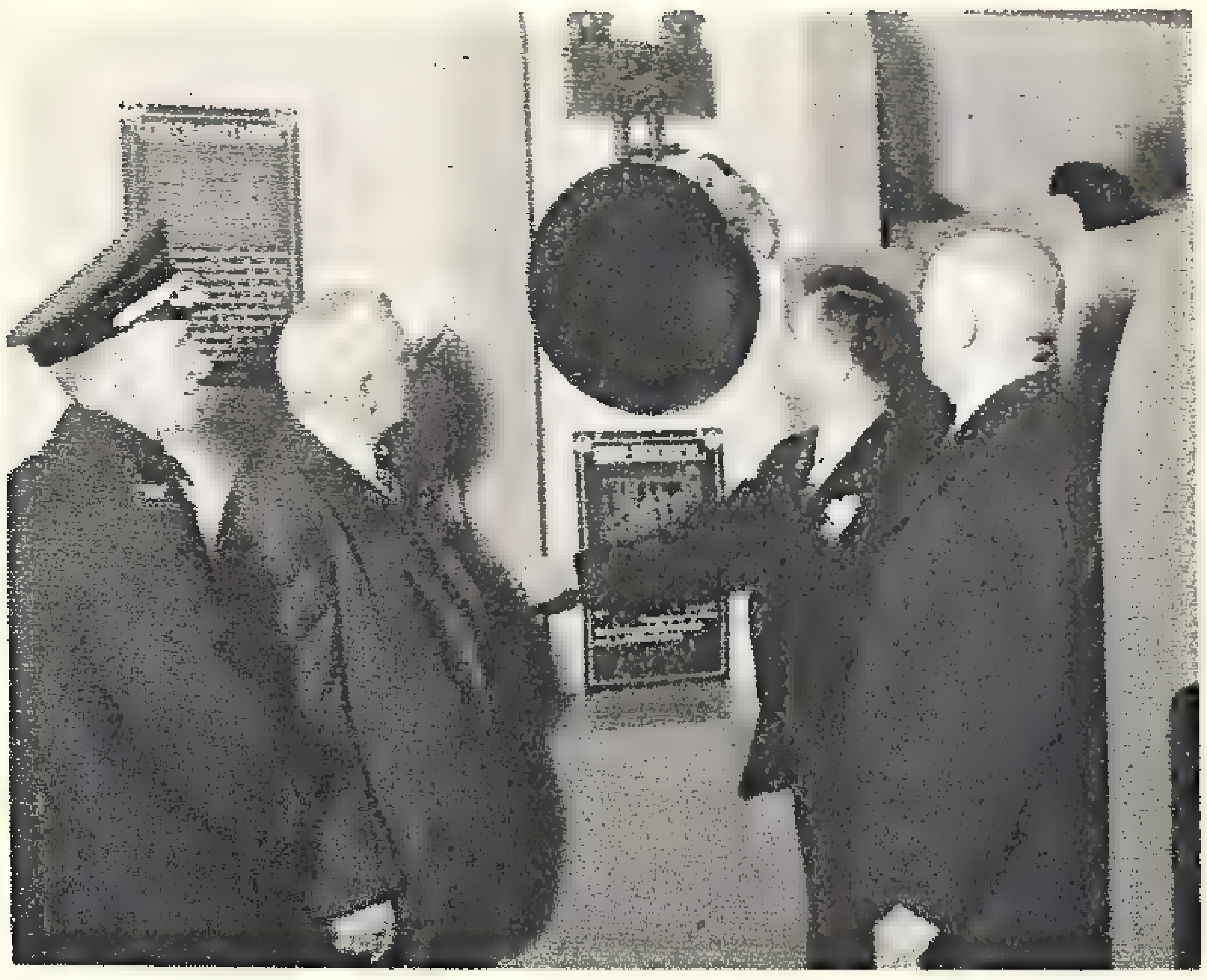
their beginning, and always from within.

Mounted police records of sixty years support the claim. There was, for example, a dangerous innovator named Jarvis. He was superintendent of a prairie division and, as far back as 1886, he was writing headquarters

[*Continued on page* 129]

The broad brimmed field hats, recognized as the trademark of the Mounties, were adopted in 1896. Before that time, the men wore "pill box" hats of a type shown in photo at left. Above — Motorcycles have extended the modern Mounties patrol range.

Device Indicates Excessive Speeding Of Autos



Using a model auto mounted on a turntable, F. H. Shepard, Jr., demonstrates his device that indicates speeding vehicles passing its electric eyes. Left to right—Police Chief James McMenamin and Public Safety Director W. S. Cuthbert, of Atlantic City, Shepard, and Dr. Otis Caldwell, noted scientist.

INVENTED by F. H. Shepard, Jr., of the Radio Corporation of America, a new electronic device indicates when the speed of any vehicle passing its photo-electric cell eyes exceeds a pre-determined rate of motion. Roadside installations of the device will make it unnecessary for motorcycle policemen to keep constantly on the go, pacing the general movement of cars over their patrol routes.

In operation, two of the devices will be placed one-quarter of a mile apart. Cars passing the first electric eye at excessive speed will cause it to flash a lighted warning sign. Failure to slow up will cause the second eye to light up and a posted motorcycle policeman will then issue a summons.

Youth Wins Model Trophy

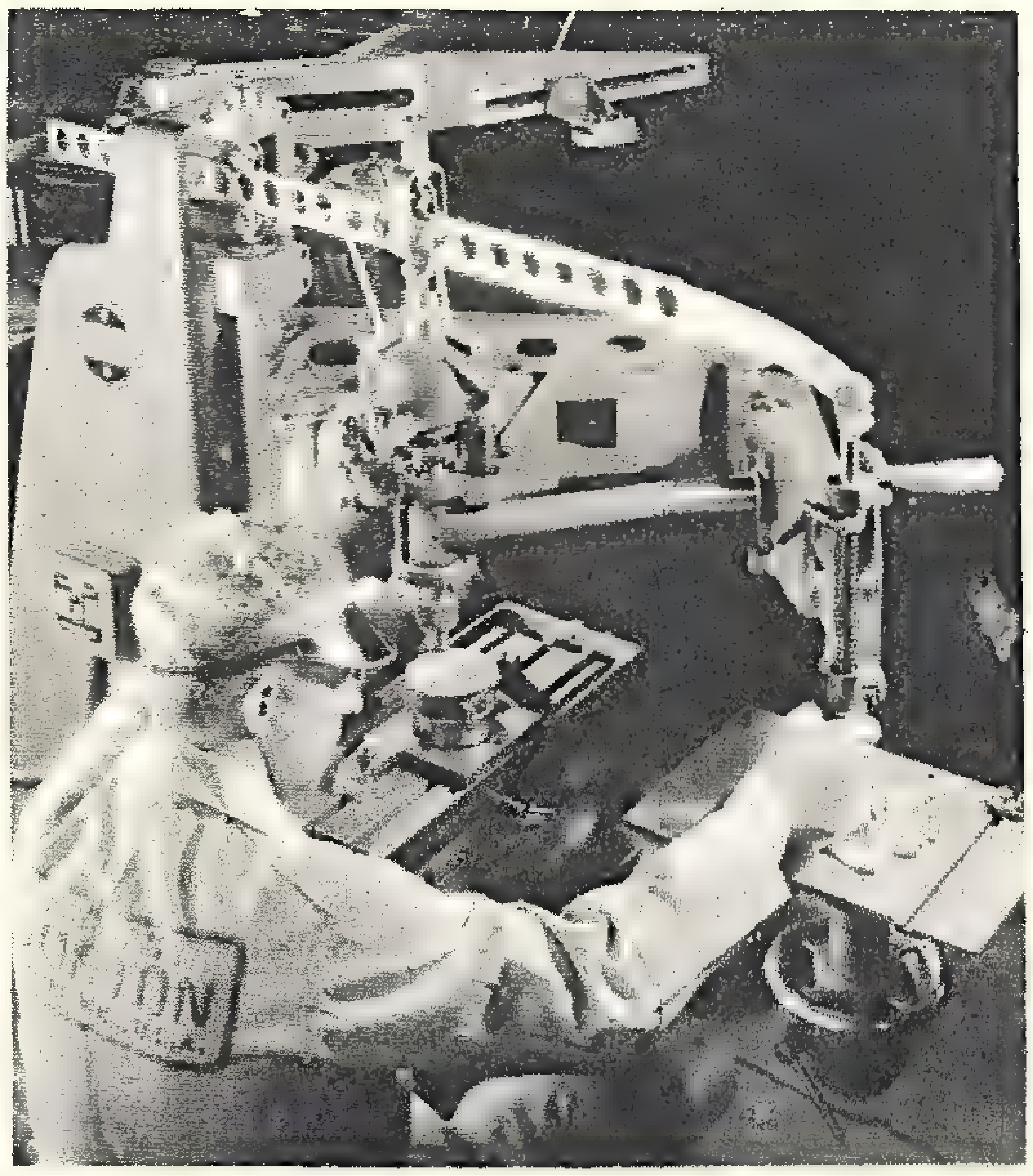
STAGED as part of the Philadelphia Air Observance Week program, a model contest was won by Arthur Koslow, 15-year-old local schoolboy, with a flight of 15 minutes, 11 seconds. Igor Sikorsky, noted airplane designer, presented the youth with a trophy donated by Frank Palumbo, Philadelphia sportsman.

Koslow's model was of the stick endurance type, powered with a rubber strand motor. The wings were covered with transparent micro-film which has a weight only one-eighth that of tissue paper.

Aviation authorities recognize the value of model plane building and contests are now featured at many exhibits of real aircraft.

Igor Sikorsky, famous airplane designer (right), presents trophy donated by Frank Palumbo (center), to Arthur Koslow whose micro-film covered model flew for 15 min., 11 sec.

Huge Pantograph Developed



This electric pantograph machine enables the operator to trace the contours of a model with a right hand tool while a left hand tool reproduces the design on a die block.

A HUGE electrically powered pantograph machine for reproducing die designs from an enlarged model has been developed by a manufacturer in Racine, Wis. The device has nine spindle speeds between 1,100 and 9,200 r.p.m.

The model from which the die is to be made is set up in a holder and a die block is secured beneath a cutting attachment. Tracing the model contours with the holding tool, the cutter reproduces the contours in the die block.

MECHANICAL DEVICES Help the Blind

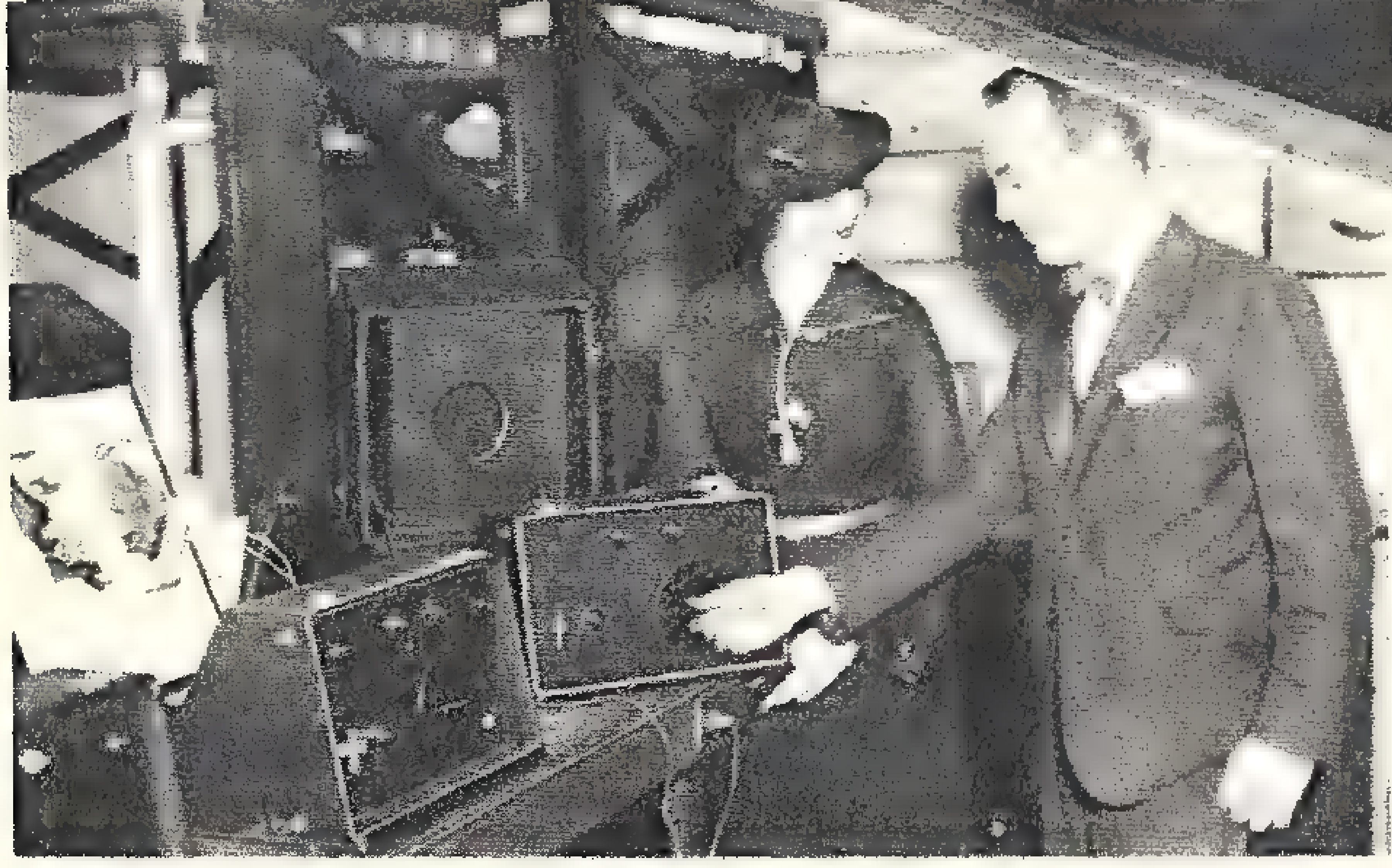
Under supervision of qualified teachers, blind students are taught to type on a machine (above) that prints letters in the form of raised dots (Braille). Below—Blind proof reader reading text from a Braille transcription to a teacher.

MECHANICAL devices in the form of spring and electric powered talking machines, relief maps, and machines for typing Braille, the system of raised dots "read" by the blind through their fingertips, are being used to make the lot of the sightless less burdensome.

The talking machines, built under the supervision of the American Foundation for the Blind, are the property of the Library of Congress. They are used to afford the blind the pleasures of literature without requiring mastery of the intricate Braille system, complete books being transcribed on records which can be listened to by individuals or groups. The machines and records are loaned to libraries throughout the country without charge.

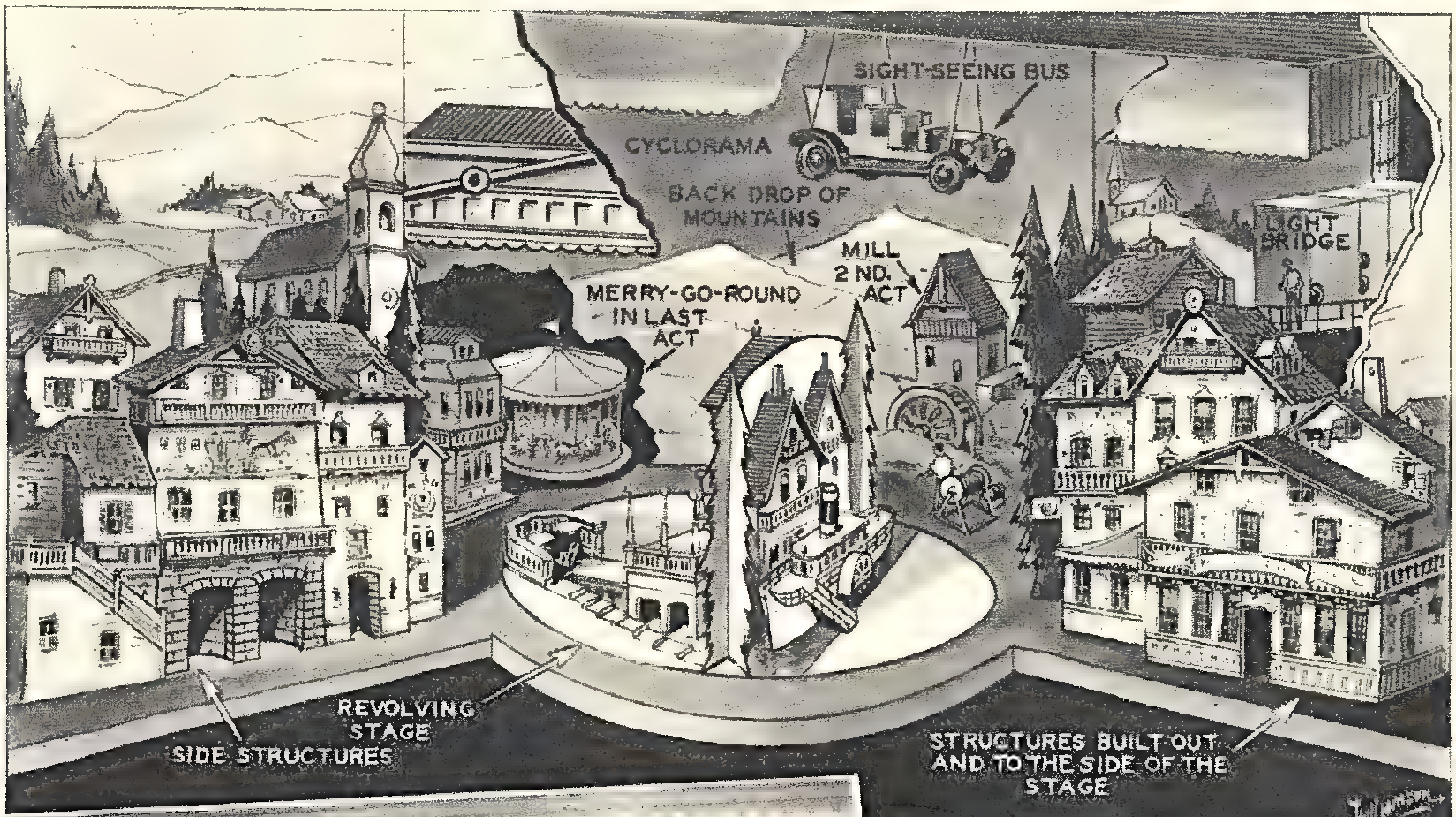
Records for the machines cost about $75,000 annually and about 165 titles are recorded. Titles range from transcriptions of the Old Testament to the latest fiction novel. A full recording of an average novel requires both sides of 15 records.

Through their sensitive fingertips, trained by a study of Braille, blind students can study history and geography by tracing the contour lines, dots, etc., on special relief maps. Produced at the Perkins Institute for the Blind at Watertown, Mass., under the supervision of its director, Dr. Gabriel Farrell, the maps are distributed by Works Progress Administration employees.



Specially designed electric talking machines (shown above) enable the blind to enjoy literature transcribed on records.

Mechanical Devices Feature Show


SIGHT-SEEING BUS
CYCLORAMA
BACK DROP OF MOUNTAINS
LIGHT BRIDGE
MILL 2 ND. ACT
MERRY-GO-ROUND IN LAST ACT
REVOLVING STAGE
SIDE STRUCTURES
STRUCTURES BUILT OUT AND TO THE SIDE OF THE STAGE

The many mechanical details involved in the production of *White Horse Inn,* at the Center Theater in N. Y. City, are shown in the artist's sketch above. Electrically operated elevator stages, revolving stages, sound and lighting control rooms, a sight-seeing bus slung up out of sight until needed, and a moving steamboat are a few of the mechanical details of the show. A cast of 185 makes eight costume changes during the show and over 1,500 property effects, from plates to mechanical animals, are used. Photos show typical scenes.

REQUIRING 63 stage hands to operate mechanical devices, the play "White Horse Inn," at the Center Theater in New York City, creates a record for the application of mechanical ingenuity in the production of a major show on the legitimate stage. In its 22 scenes, involving 12 changes of settings, the show features a revolving stage, a moving steamboat, movable restaurants, mechanical animals, a merry-go-round, a sight-seeing bus, and a mill.

The electric power consumed at one performance is enough to light a small city. During a rain scene 150 gallons of water are drained off by an enormous funnel.

Lightning and thunder effects are operated from a central switchboard which also moves clouds across mountains and controls the center revolving stage. Two carloads of lumber, two miles of canvas, and 1,500 gallons of paint were used in building the numerous artistic and gaily colored sets.

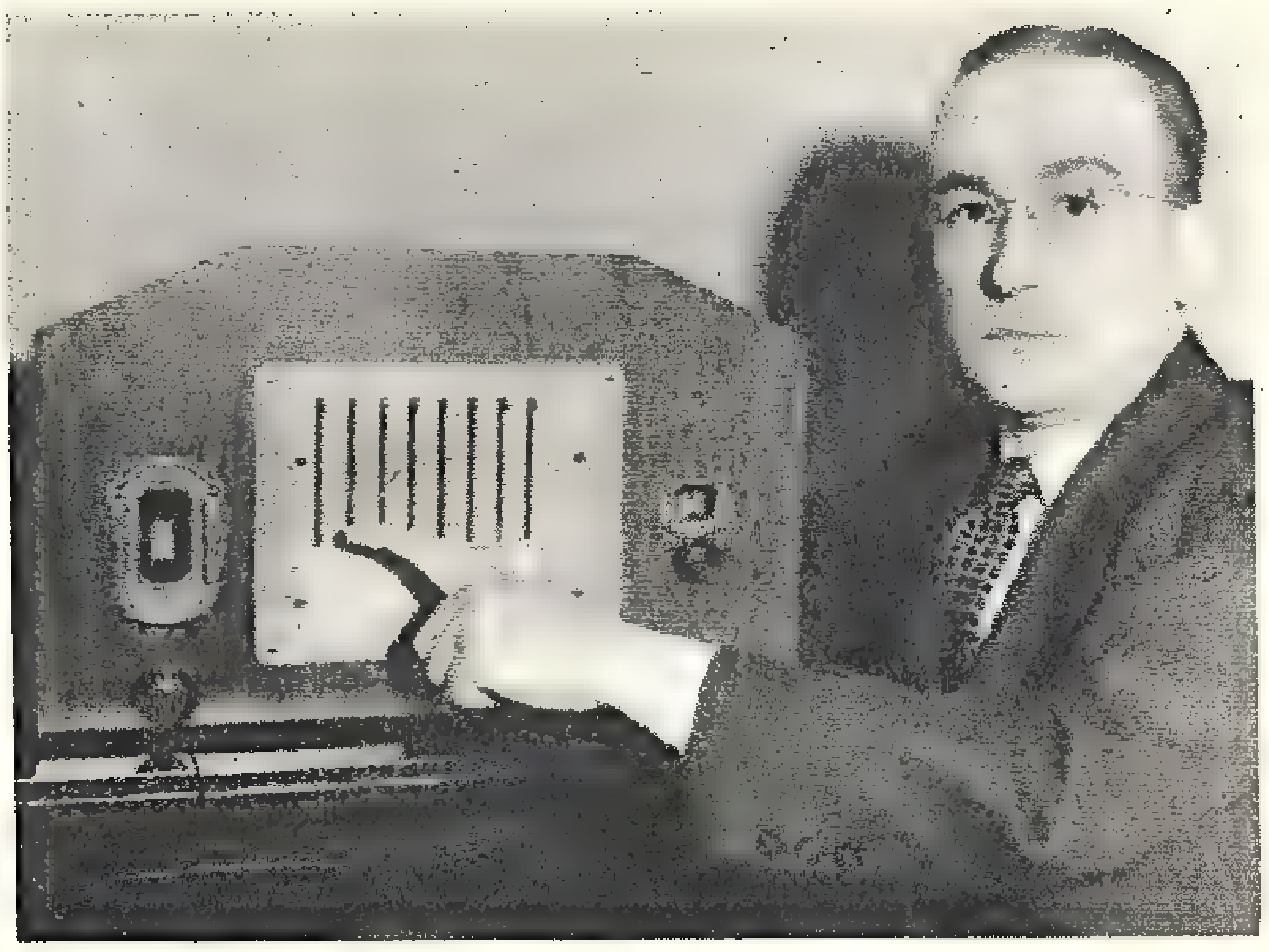
Tuner Brings In Television And Broadcast Stations

A DEVICE which requires only the pressure of the hand on a lever to tune in either a television or broadcast station or both, is the invention of LeRoy J. Leishman, of Los Angeles, Calif.

So precise in its operation that no stabilization circuit is required, it will tune in a broadcast and television station in less than one-half a second.

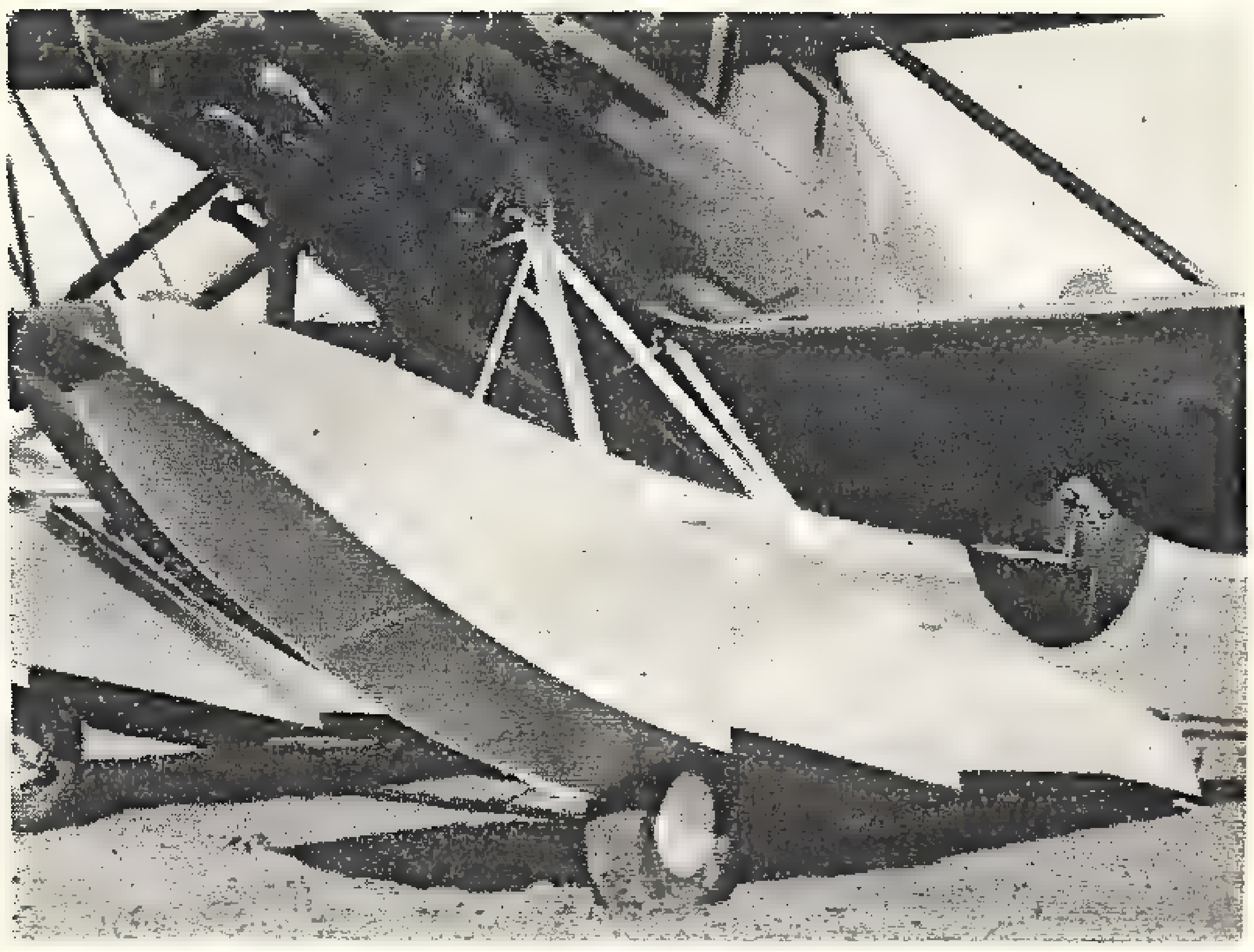
To place the tuner in operation for the first time, it is necessary only to tune in the stations, press down one of the levers, and "set" the set screw. The lever springs back into place and afterward needs only to be pressed down to bring in the desired station or stations. The tuner may be equipped with as many levers as desired for corresponding stations, and the "set" may be changed at any time.

The invention not only provides for automatic tuning, but makes possible utilization of the present 23 million radio sets for television purposes.



LeRoy L. Leishman, of Los Angeles, Calif., is shown demonstrating his invention which automatically tunes in either television or broadcast station, or both, merely by pressing lever.

Sport Planes Go Amphibian



Amphibious Float gear, adaptable to present popular planes, is brought out by the Edo Aircraft Corporation, of College Point, L. I., giving the pilot an opportunity to change from land to sea plane at will.

AN AMPHIBIOUS float gear, adaptable to present popular planes, has been designed by the Edo Aircraft Corporation, College Point, L. I.

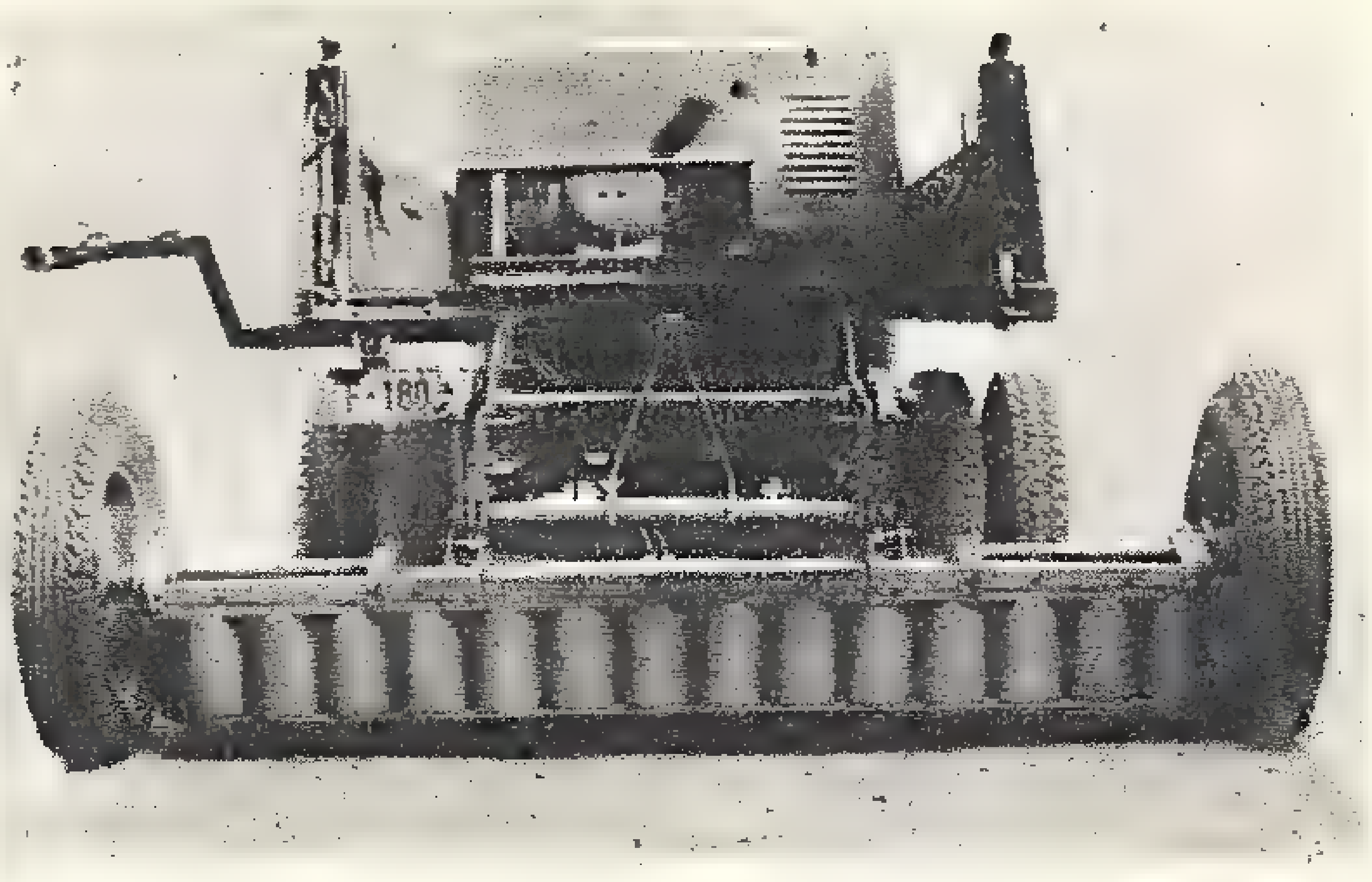
Each of the wheels in the main landing gear is supported by a pivoted yoke, which connects through a shock strut to a small crank concealed under the deck of the float. To raise or lower the wheels, the cranks are operated in unison by a handle in the pilot's cockpit. The wheel compartment is made air tight at the top.

Electro-Magnets Clear Roads

DESIGNED to pick up nails, pins, bottle caps, and other metal objects from the highway, which constitute a traffic hazard, this electro-magnet was constructed by the Quebec Roads Department. Supported by its own wheels, this magnet, or series of magnets, is attached to the rear of a truck, and is raised or lowered as desired by means of a hydraulic cylinder mounted on the truck.

A special engine and generator unit is mounted on the rear of the towing vehicle and furnishes electricity for the magnets.

Covering eight feet of road width, the apparatus will pick up junk while traveling at an eight to 12-mile an hour speed. On one run, 18 pounds of metal were picked up during the time the magnets traveled over 12 miles of highway. The department plans to construct several more of these machines in the near future.



Magnets attached to a Quebec Road Department truck clears an eight-foot strip of highway of nails, hooks, pins, bottle caps, and other metal objects, as it travels at an eight to twelve mile an hour speed.

SCIENCE Finds

by Josephine Timberlake

"MY BABY was born deaf and dumb," a mother said to me recently, indicating a bright, attractive looking little boy about four years old.

"Oh, no, he wasn't!" I assured her promptly. "He may have been born deaf, but he wasn't born dumb any more than any other baby is. He hasn't learned to talk because he hasn't heard other people talking—just as you haven't learned to talk Russian because you haven't heard people speaking that language. His vocal organs are all right, and his mind is all right, and he can be taught."

Only a few score years ago nobody would have told the mother of a deaf child anything like that. He would have been obliged to grow up not only speechless, but far worse. Because nobody could communicate with him, he would have been considered idiotic. He would not even have learned to read and write. He would not have been allowed to inherit property; he could not have transacted even the simplest business. If his mother had taken him to a doctor, horrible things might have been done to him, for it was thought that his inability to speak was a thing apart from his deafness. His tongue might have been slashed or scraped, or his throat injured, in a misguided effort to give him the use of his vocal organs.

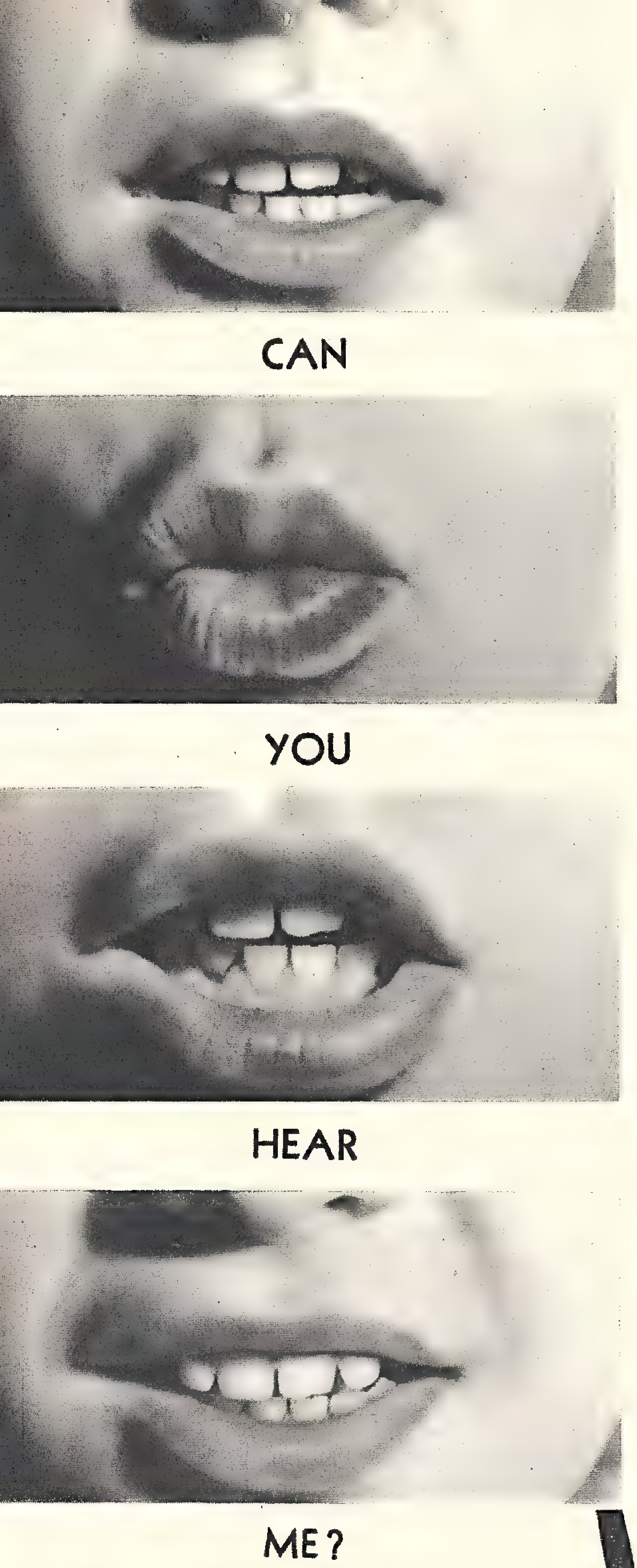
In the 16th and 17th centuries, a few teachers discovered the possibility of educating the deaf, and taught certain isolated cases; and toward the middle of the 18th century groups of deaf children began to have a better chance in life. A French priest, named de l'Epee,

New Aids for DEAF

Devices no more conspicuous than spectacles now amplify sounds sufficiently to enable those with partial hearing to carry on conversation and to live normal lives. If only the middle ear is impaired, tiny electrical oscillators behind the ear can carry sound through bone structure to the still healthy inner ear. If the inner and not the middle ear is affected, an air conduction instrument may be helpful. Miss Josephine Timberlake author of this article and superintendent of the Volta Bureau, is pictured at the right.

Advances in lip reading, perfection of electrical devices lessen hard of hearing terrors.

and a teacher in Germany, named Samuel Heinicke, established small schools. Heinicke taught his pupils speech and lip reading, the method used by the earlier teachers. De l'Epee tried to do the same, but his school was free, and so many children were brought to him that he was forced to devise a more rapid means of communication. He invented a system of signs to express ideas, and supplemented these by the use of a finger alphabet which had long been in use among monks who had taken vows of silence. His sign language, greatly amplified and improved by his successor, was the forerunner of that which is beloved today by many adult deaf persons in all parts of the world. Its use in schools is frequently



George Cook, a Buffalo, N. Y., instructor in lip reading, illustrates how lips indicate the sounds of various words. Buffalo is one of the centers of lip reading education with a League for the Hard of Hearing often conducting contests in the art which is available there both in public and private schools.
Buffalo Times Photo

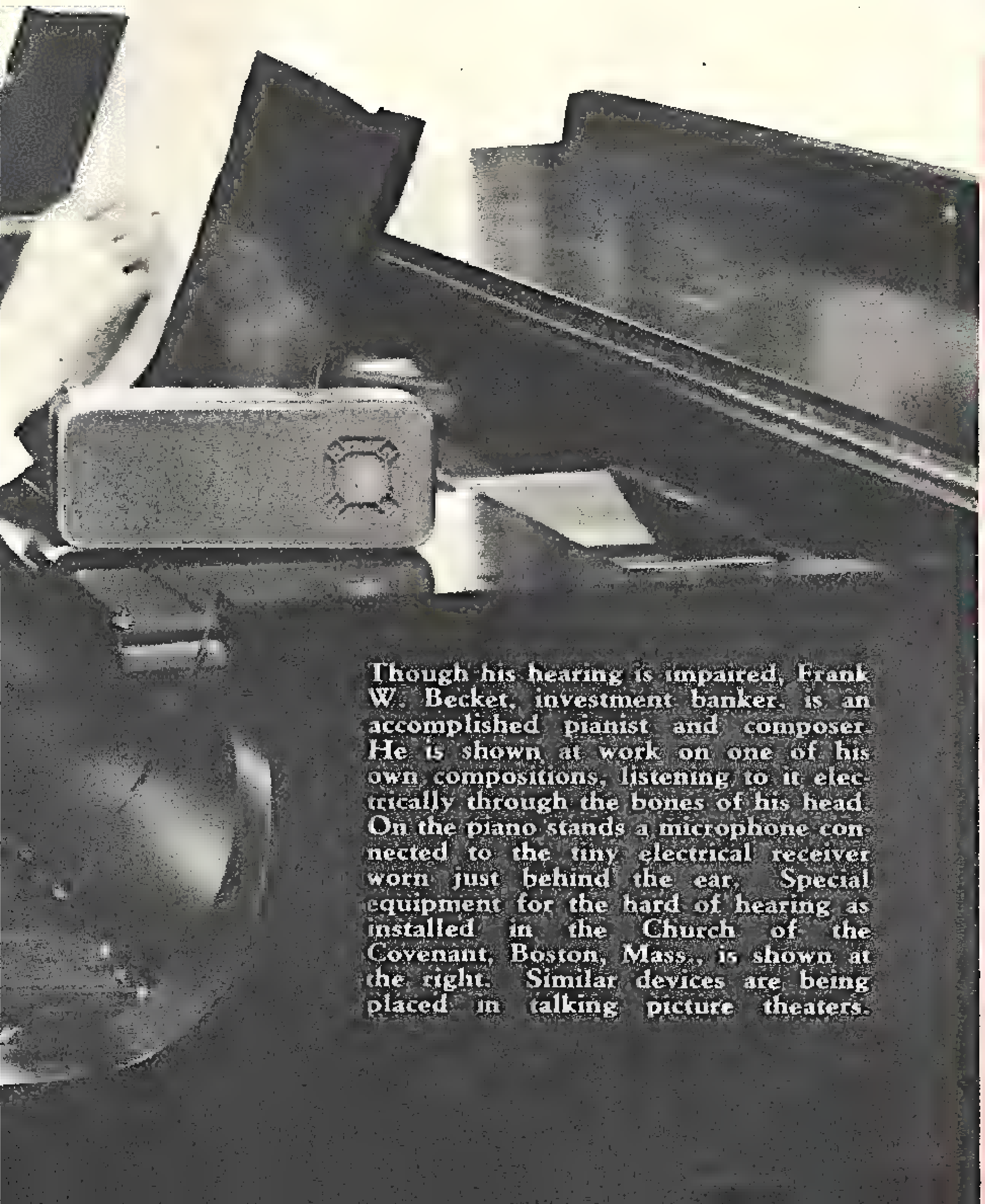
discouraged, because it is a handicap in learning English (or French, or German, or whatever the native language is), but it is an easier means of communication than speech and lip reading, and consequently many of the deaf prefer to use it among themselves.

It took a long time for the work begun by these pioneers to spread to other parts of the world, but a permanent school in the United States was established in 1817. It was called "The American Asylum for the Deaf and Dumb," the idea being that the one institution would be adequate to care for all of the deaf in the country. The name of its founder, Thomas Hopkins Gallaudet, appears in mosaics on the walls of the Library of Congress among other pioneers in American education, and the only college for the deaf in the world, Gallaudet College, Washington, D. C., does him honor. It took his school nearly a hundred years to get rid of the objectionable words "aslyum" and "dumb," and the former still clings to the original site, Asylum Avenue, Hartford, Conn.

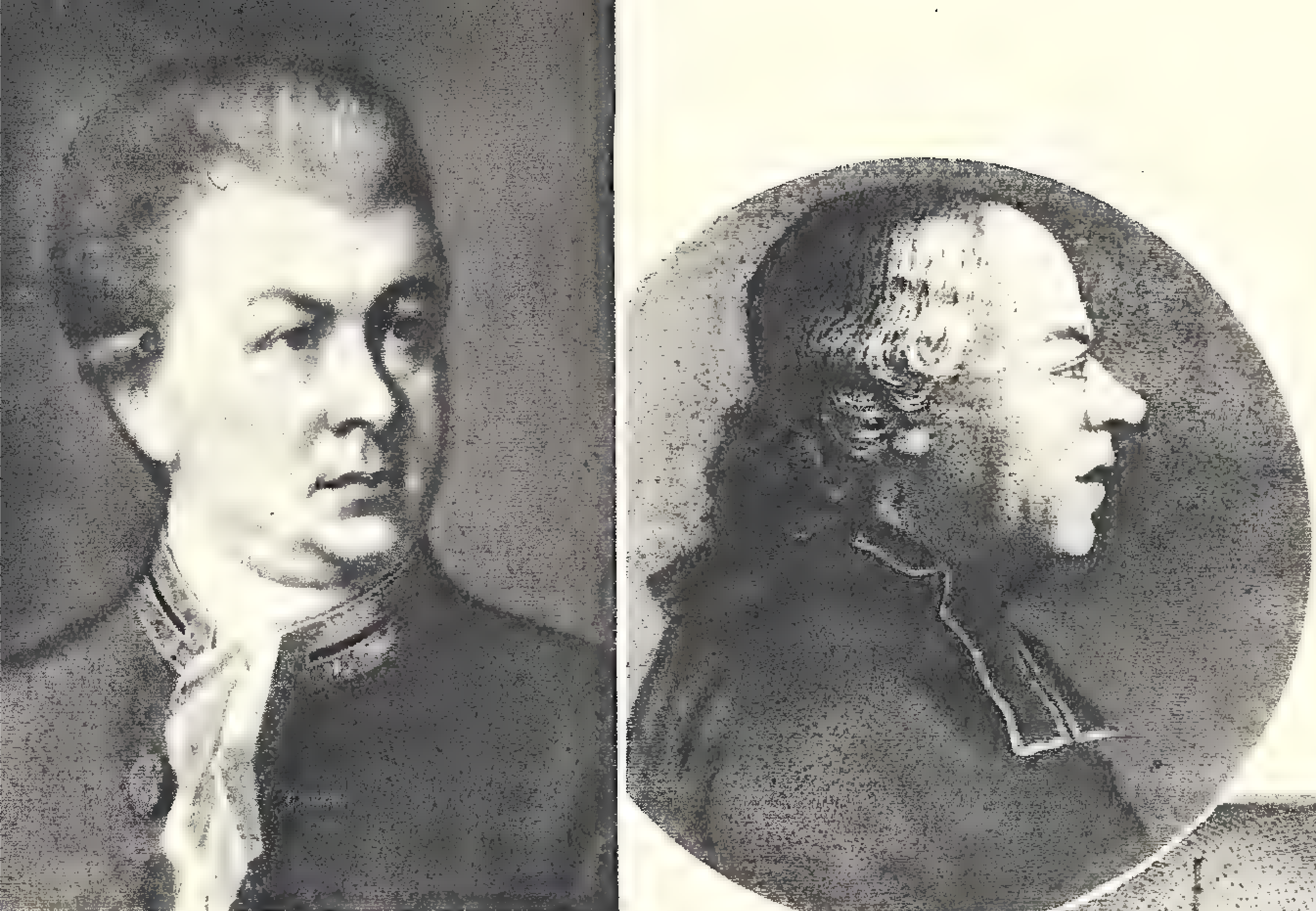
We have had a little more than one hundred years in which to attain our present stage of development. The realization that more schools would be needed, soon became apparent, and others were established in rapid succession. At first, the children were all

taught by means of the sign language and finger spelling. Those who had had speech before the loss of hearing sometimes retained it in part, but they received no training in its use, and it was thought quite impossible for those born deaf to learn to speak at all. This state of affairs continued until after the War Between the States, when some very prominent individuals began to play parts in changing the picture. One was Mrs. Henry Lippitt, wife of the Governor of Rhode Island; another was Mrs. Gardiner Greene Hubbard, whose husband founded the National Geographic Society. Both of these ladies had little girls who were totally deafened by scarlet fever at the age of four or five. Both made up their minds that their children should not be deprived of the speech that was their rightful heritage. All prophecies to the contrary notwithstanding, they succeeded in retaining the speech of their little daughters, and in teaching them to understand others by lip reading, which is watching the movements of the face in speech. An obscure, indomitable little teacher, Harriet Rogers, also was thrust into a conspicuous place when the pupils she had taught speech and lip reading were called to demonstrate her success to the Massachusetts Legislature, so that a charter might be granted for the establishment of a school to teach the deaf speech instead of signs.

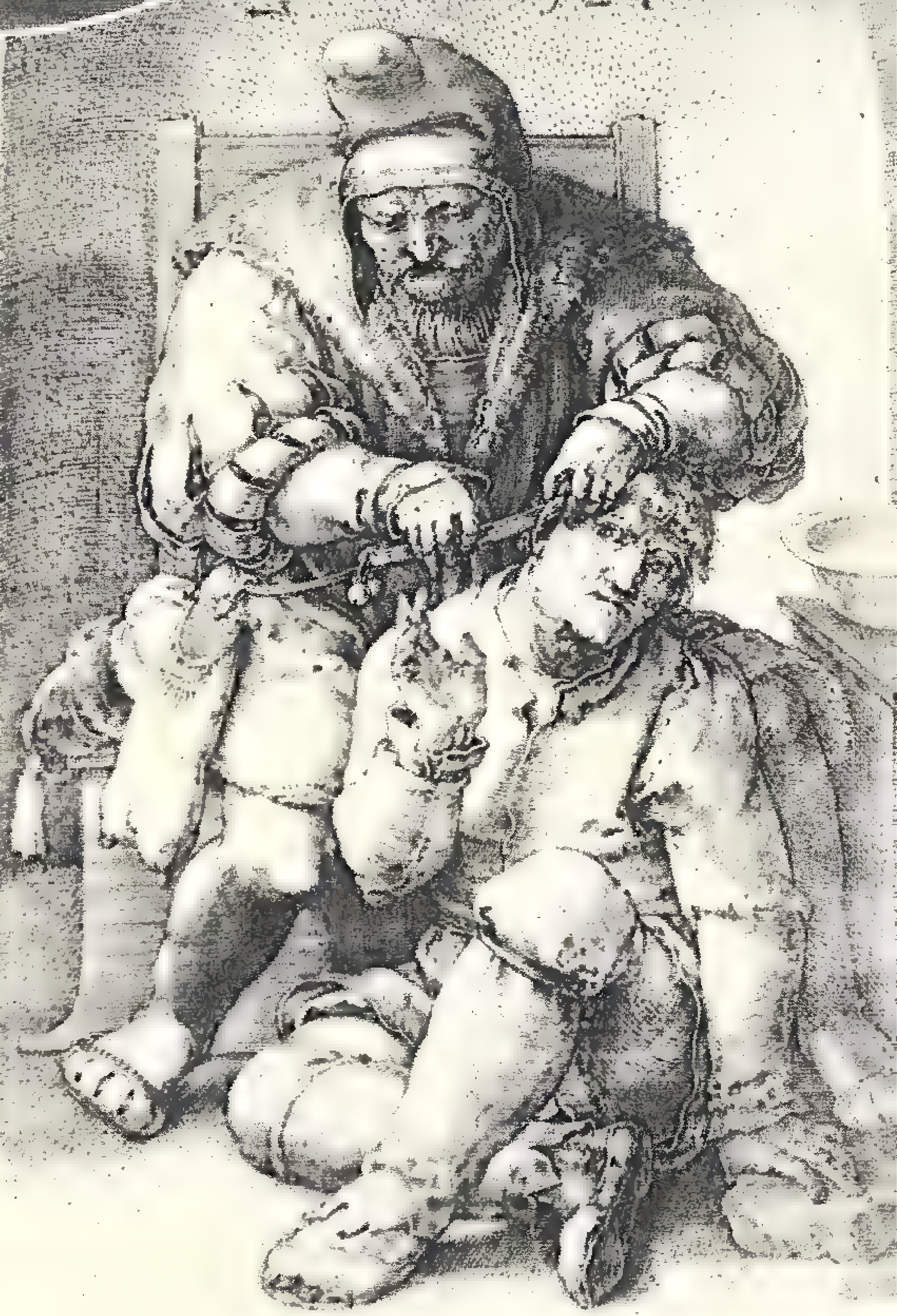
Speech teaching received its real impetus



Though his hearing is impaired, Frank W. Becket, investment banker, is an accomplished pianist and composer. He is shown at work on one of his own compositions, listening to it electrically through the bones of his head. On the piano stands a microphone connected to the tiny electrical receiver worn just behind the ear. Special equipment for the hard of hearing as installed in the Church of the Covenant, Boston, Mass., is shown at the right. Similar devices are being placed in talking picture theaters.



Pioneers in the field of instruction for the deaf were Samuel Heinicke, German teacher, above, and Abbe de l'Epee, French priest shown in circle. Heinicke first taught lip reading. De l'Epee invented a system of signs with which the deaf could express ideas. His system was the forerunner of the one used by many adult deaf today.



Before modern times, the lot of a deaf person was likely to be tragic. Deaf children grew up speechless and often were subjected to barbaric medical treatment. This engraving by Lucas van Leyden from the Bettman collection shows an operation behind the ear as performed in the year 1524.

with the advent of Alexander Graham Bell. Cultured, dignified, enthusiastic, picturesque, the son and grandson of experts in speech-teaching, he acquired early in life an interest in the deaf that amounted to a passion for improving their condition. As long as he lived he replied, when asked his occupation, "I am a teacher of the deaf." His celebrity as the inventor of the telephone and his possession of financial means helped him to arouse much interest in the cause he upheld, and his friendliness and dynamic leadership enabled him to set in motion forces which were to result in great changes for all those handicapped by absent or deficient hearing.

His chief interest was in having the deaf taught speech. He taught them himself, with remarkable success. He gave courses in speech-teaching to their teachers. He lectured and demonstrated in their behalf. Finally, finding himself unable to cope with the immense flood of letters that brought him inquiries of every nature dealing with deafness, he founded and modestly endowed the Volta Bureau "for the increase and diffusion of knowledge relating to the deaf." Later he gave the bureau to an organization which he had founded subsequently, The American Association to Promote the Teaching of Speech to the Deaf. Its service as an information center has become not only nation-wide but world-wide, and it is still housed in the building he erected for it in Washington, D. C. Its reference library on deafness is probably the most complete in the world, and its magazine, the *Volta Review,* is the only one in American that deals not only with the education of those deaf from childhood but also with the everyday problems of those who lose their hearing in adult life.

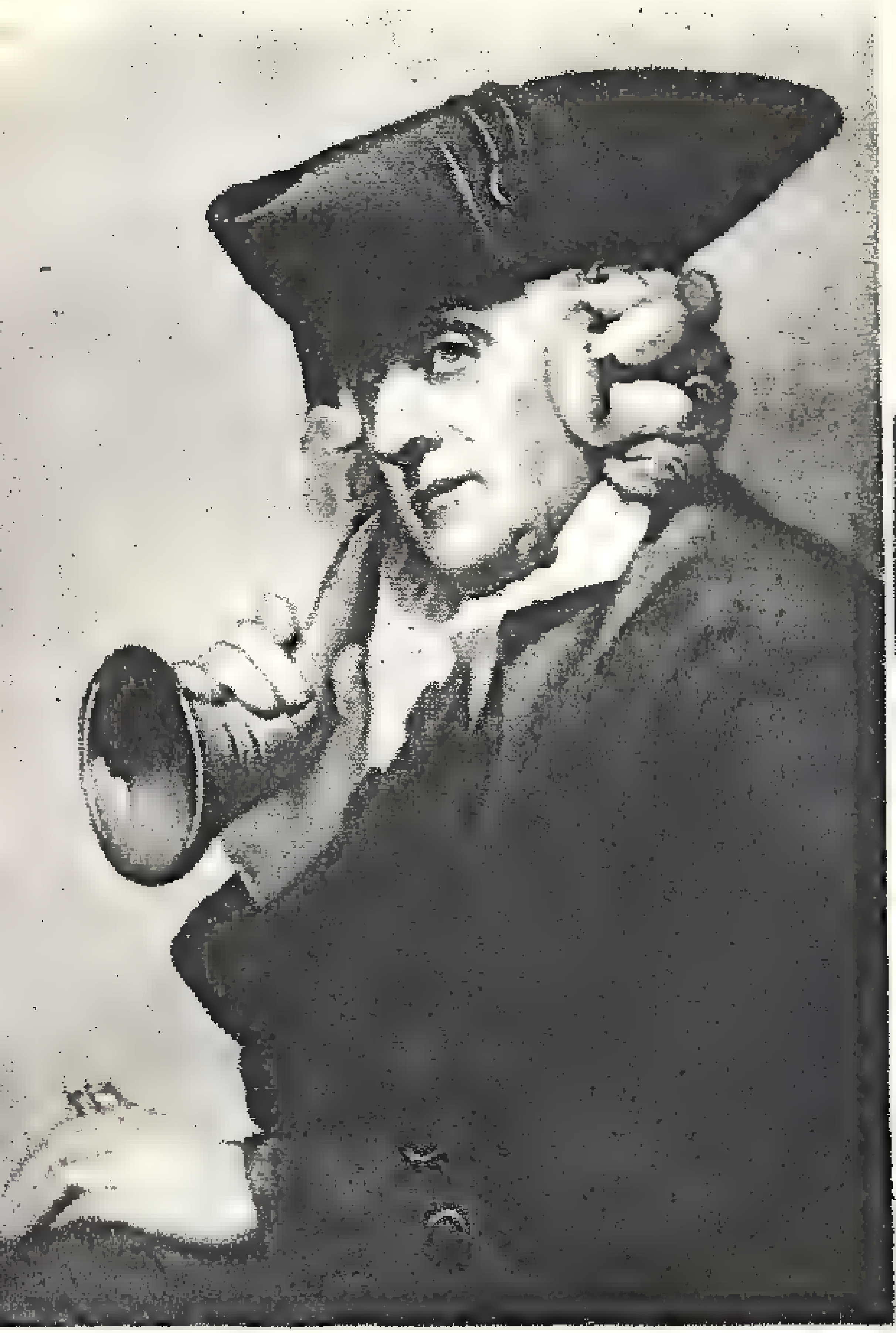
Two other very well known names are connected with the Volta Bureau's history. Sinclair Lewis was employed there at one time, as assistant editor of the *Volta Review;* and Mrs. Calvin Coolidge was a member of the Board of Directors while her husband was vice president of the United States. Mrs. Coolidge, by the way, is still actively interested in the education of the deaf, being president of the Board of Corporators of the school where she once served as teacher—the school for which Harriet B. Rogers fought in her demonstrations before the Massachusetts Legislature—Clarke School, Northampton, Mass.

Deafness still brings heartbreak and handicap wherever it attacks, but it is far from being the affliction it was a century ago.

A short time ago I paid a series of visits to schools for the deaf. This is what I saw in one of them. A class of children about ten or eleven years old, gathered around a table on which were placed the outlets for a group hearing aid. The children had come to school five or six years previously, in just the same condition as the pupils who came to the abbe de l'Epee. Not one of them had had any speech. At first they had been taught speech through the senses of sight and touch, and had learned to read the lips of their teachers and fellow students. Hearing tests had

[*Continued on page* 154]

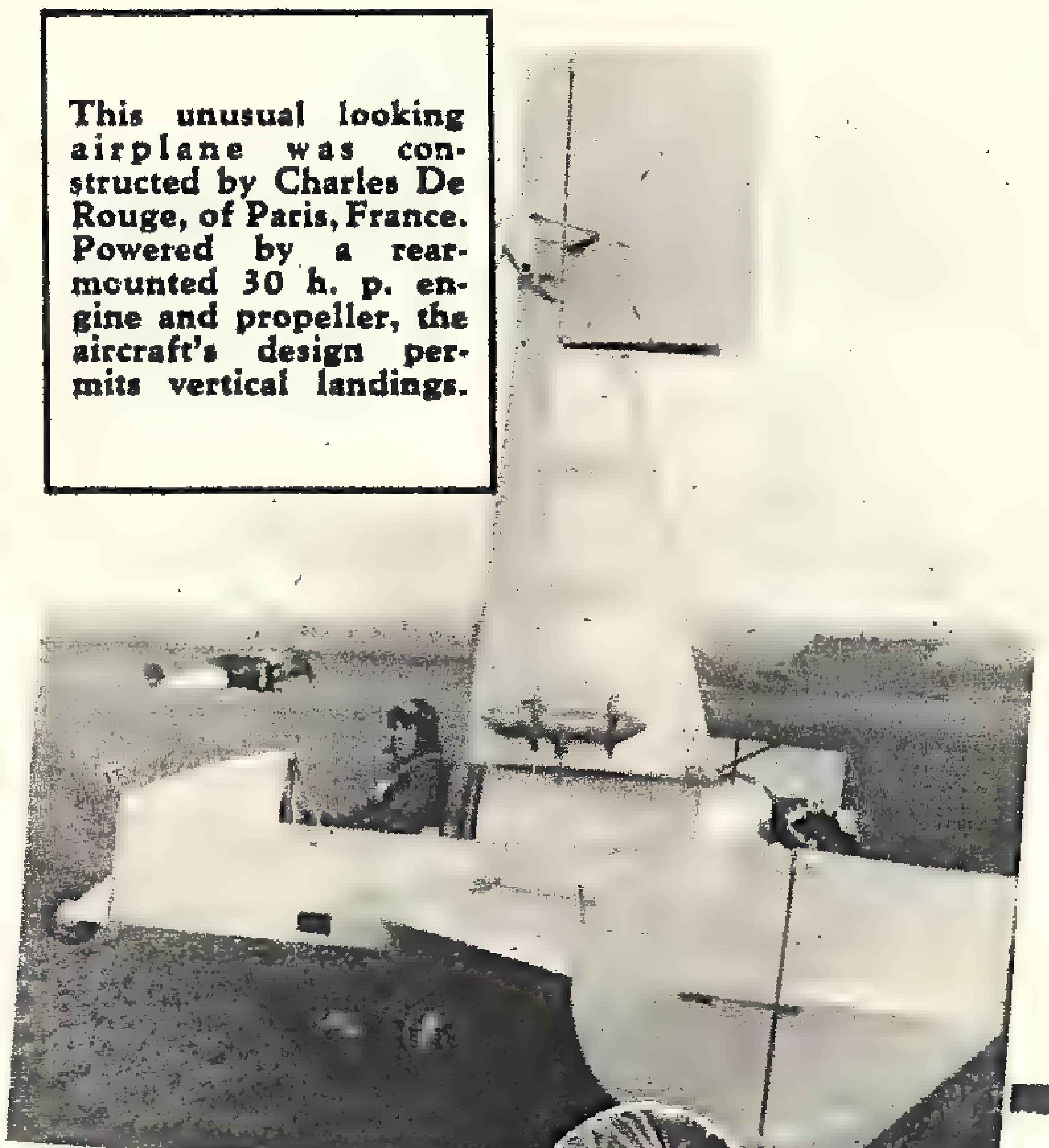
Alexander Graham Bell, inventor of the telephone, was a teacher of the deaf. Interested all of his life in teaching them speech, he founded the Volta Bureau, shown below, in Washington, D. C., and also organized the American Association to Promote the Teaching of Speech to the Deaf. The Volta Bureau takes its name from Count Alessandro Volta, the Italian physicist.



James Hutton, an 18th century physician, is pictured with his ear trumpet. Miss Sophia Alcorn is pictured at the right giving lip reading instruction to a class at the Detroit Day School for the Deaf. Most large cities have similar instruction.

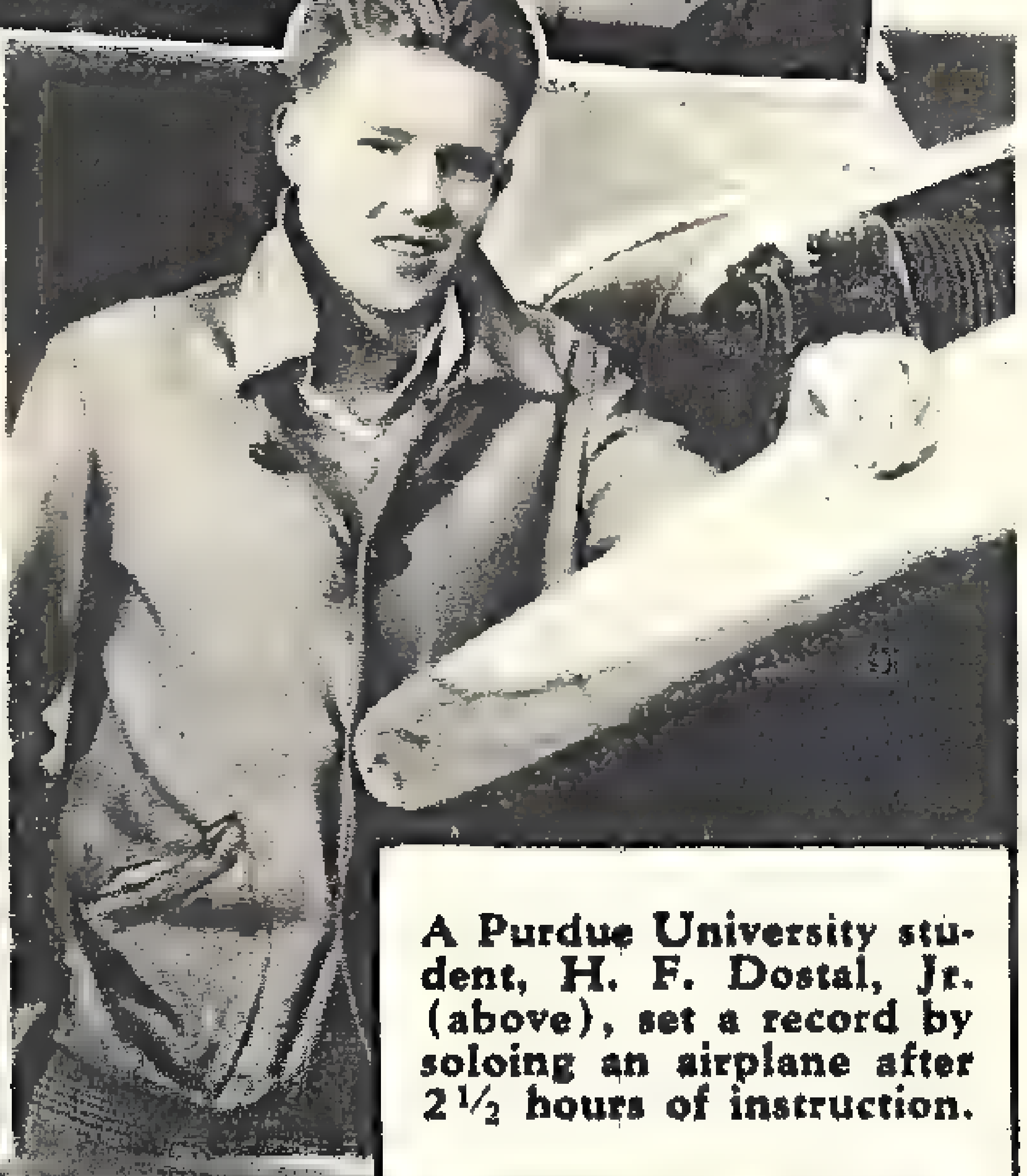
Along The Air Trails

Revolutionary in design, the propeller of this airplane has one blade and a counterweight. Invented by W. W. Everts, of Baltimore, Md. (left), shown with Frank Ellington, a friend, the novel propeller is said to increase airplane performance 25 per cent.



This unusual looking airplane was constructed by Charles De Rouge, of Paris, France. Powered by a rear-mounted 30 h. p. engine and propeller, the aircraft's design permits vertical landings.

Mrs. S. Davidson, of London, England (right), claims the distinction of being the only woman air liner pilot. Below—Ellen Roberts, 22, a Pennsylvania State College student, starts the plane in which she qualified for a license.



A Purdue University student, H. F. Dostal, Jr. (above), set a record by soloing an airplane after 2½ hours of instruction.

Gliding activities have increased throughout the U. S. Lucretia Buxton, a California pilot, tries a two-seater soarer.

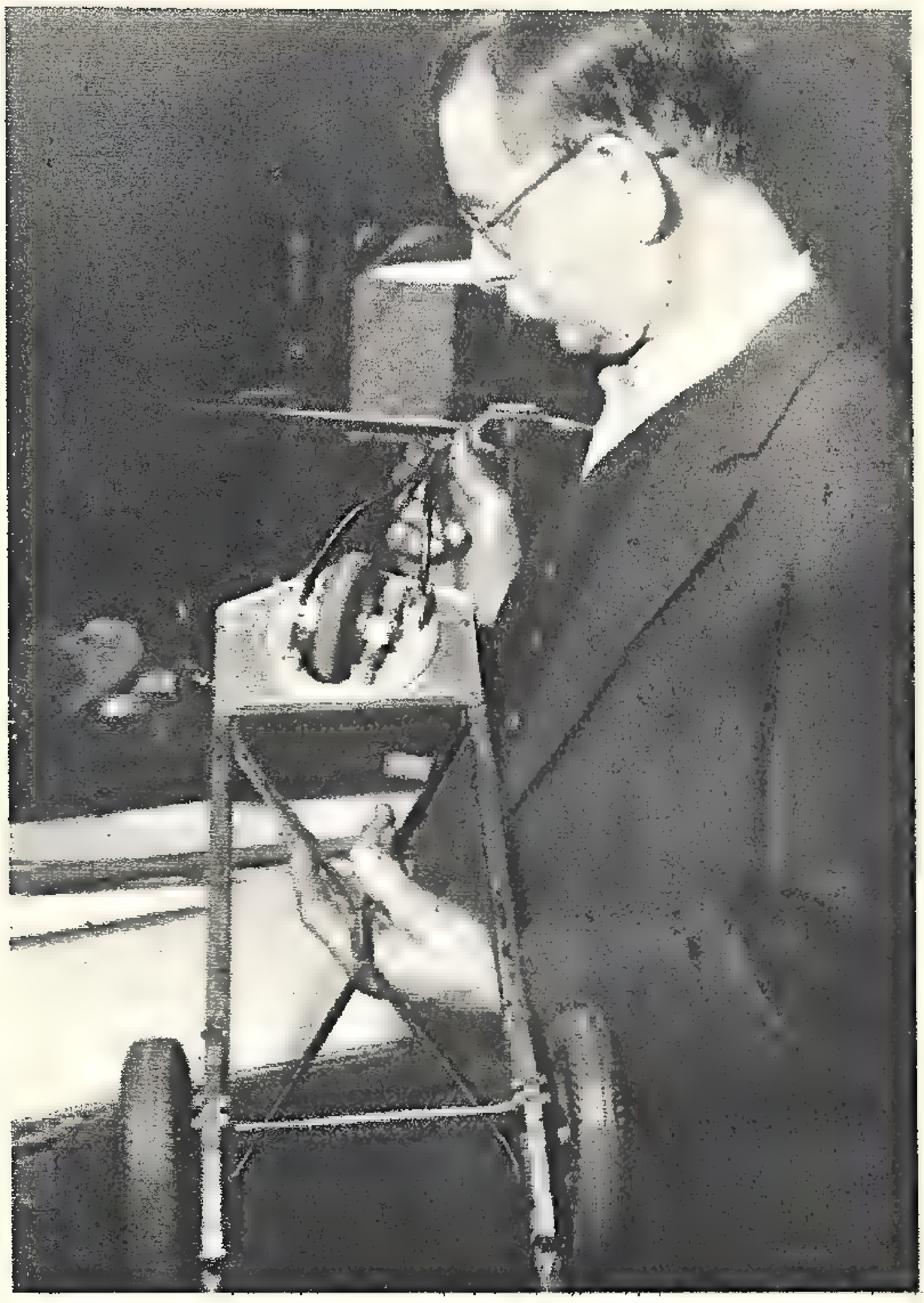
Upside-Down Movie Boat Serves As Roadside Cafe

LOCATED on the seashore near Point Magu, approximately 40 miles north of Santa Monica, Calif., on the Roosevelt Highway, is this unusual roadside cafe. Known as "David Copperfield's Boat," it was built from a small ship constructed for and used during the filming of the motion picture "David Copperfield."

Appropriately, this upside-down-boat-cafe specializes in sea food. In season, fresh lobsters, caught at Anacapa, head the menu.

Constructed for and used during the filming of "David Copperfield," this upside-down-boat now serves as a roadside cafe. Specializing in sea food, the owner has placed the boat near Point Magu, California.

Extra Wheel Aids Trailer



A third wheel shown in model is designed to remove weight from towing car and to end rear spring and axle breakdown. Device eases riding by removing much swaying and bobbing.

DESIGNED to remove the troubles from trailer travel, this third-wheel unit takes all weight off the towing car. Invented by August and Art Niemann, father and son auto mechanics of Milwaukee, the turntable unit is guaranteed to end spring and rear axle breakdown of the tow car, hitching and unhitching troubles, difficulty of weight balance in the trailer, and many other bugaboos connected with ordinary two-wheel rolling homes.

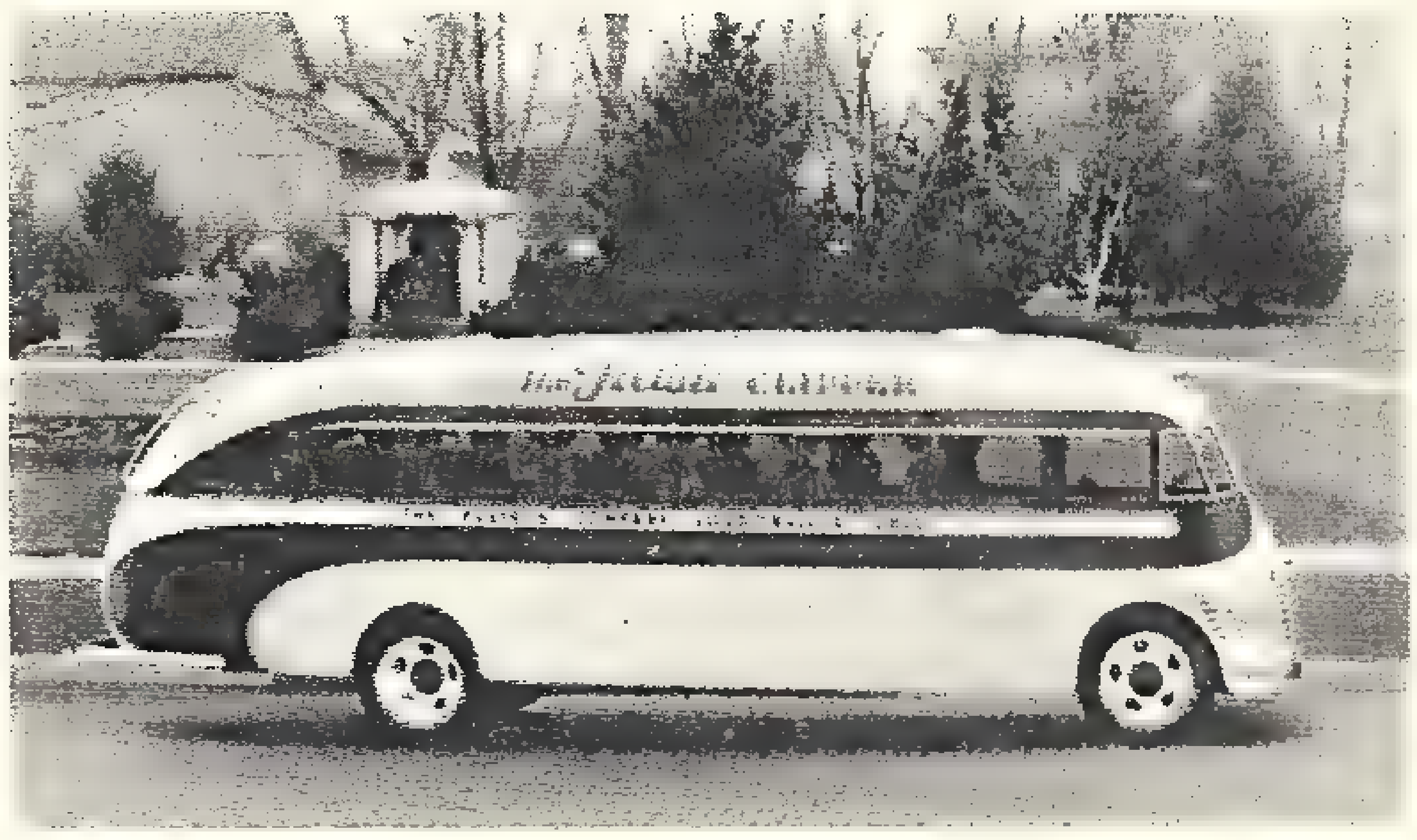
The rear wheel also makes for easier riding, eliminating bobbing and swaying.

"Clipper" Bus Is Introduced

AN ultra-streamlined bus, "The Flexible Clipper," powered by a 78-horsepower engine, and carrying 20 passengers, is being manufactured by a middle-western concern. Having air brakes and safety glass throughout, the bus provides its passengers with de luxe chairs with down pillows.

A double row of seats is placed along the right side of the interior, and a single row along the left side. Also, provisions are made for the installation of five auxiliary seats. Interior side lights are of modernistic design with dome lights over the aisle. The safety glass windows are mounted in anti-rattle spring tension channels with heavy quick action crank type window regulators.

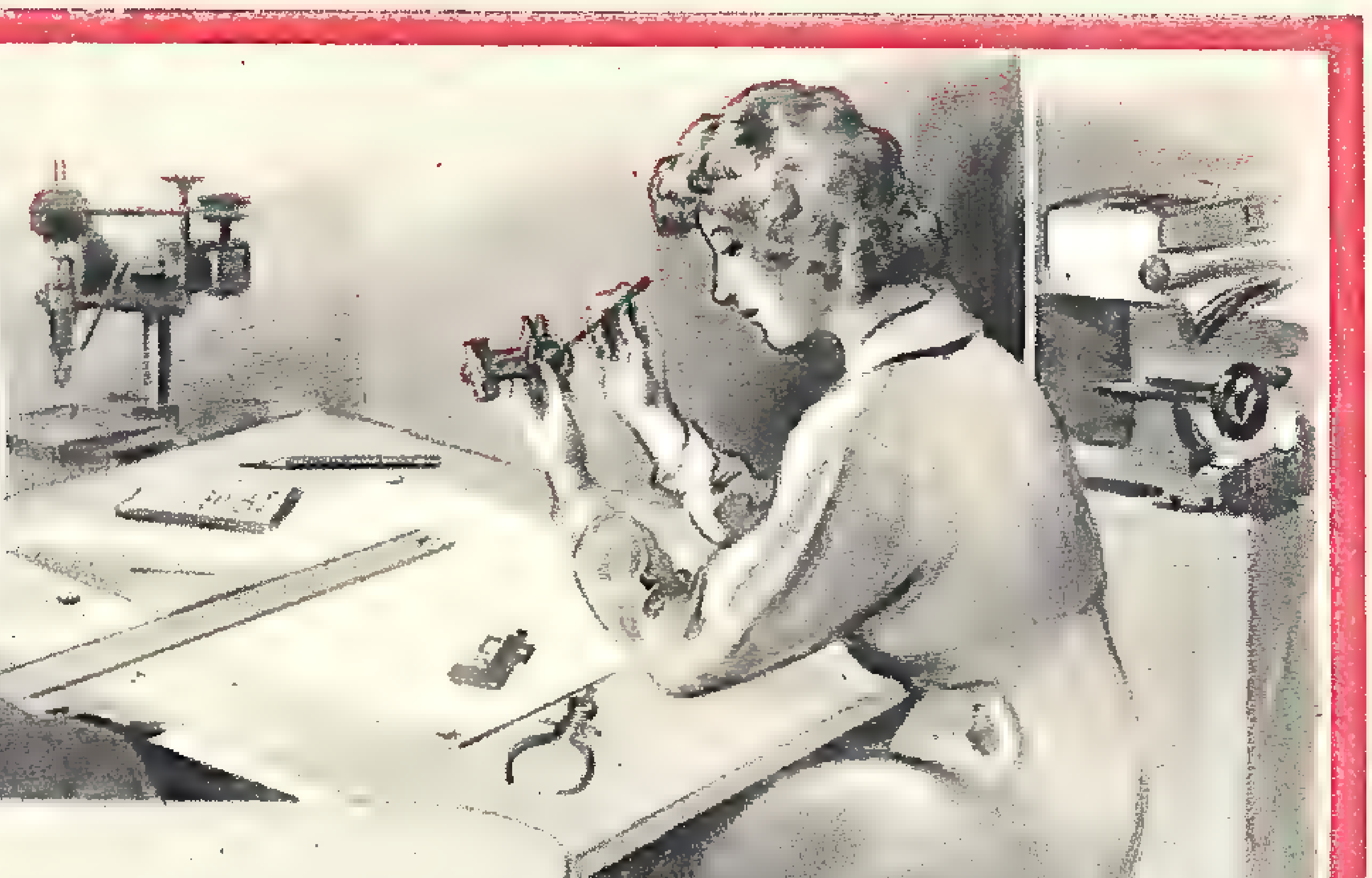
Entrance to the bus is through a 67-inch door opening outward. An emergency exit for passengers is provided in the center panel on the left side. With a 182½-inch wheel base, the bus measures 320 inches overall.

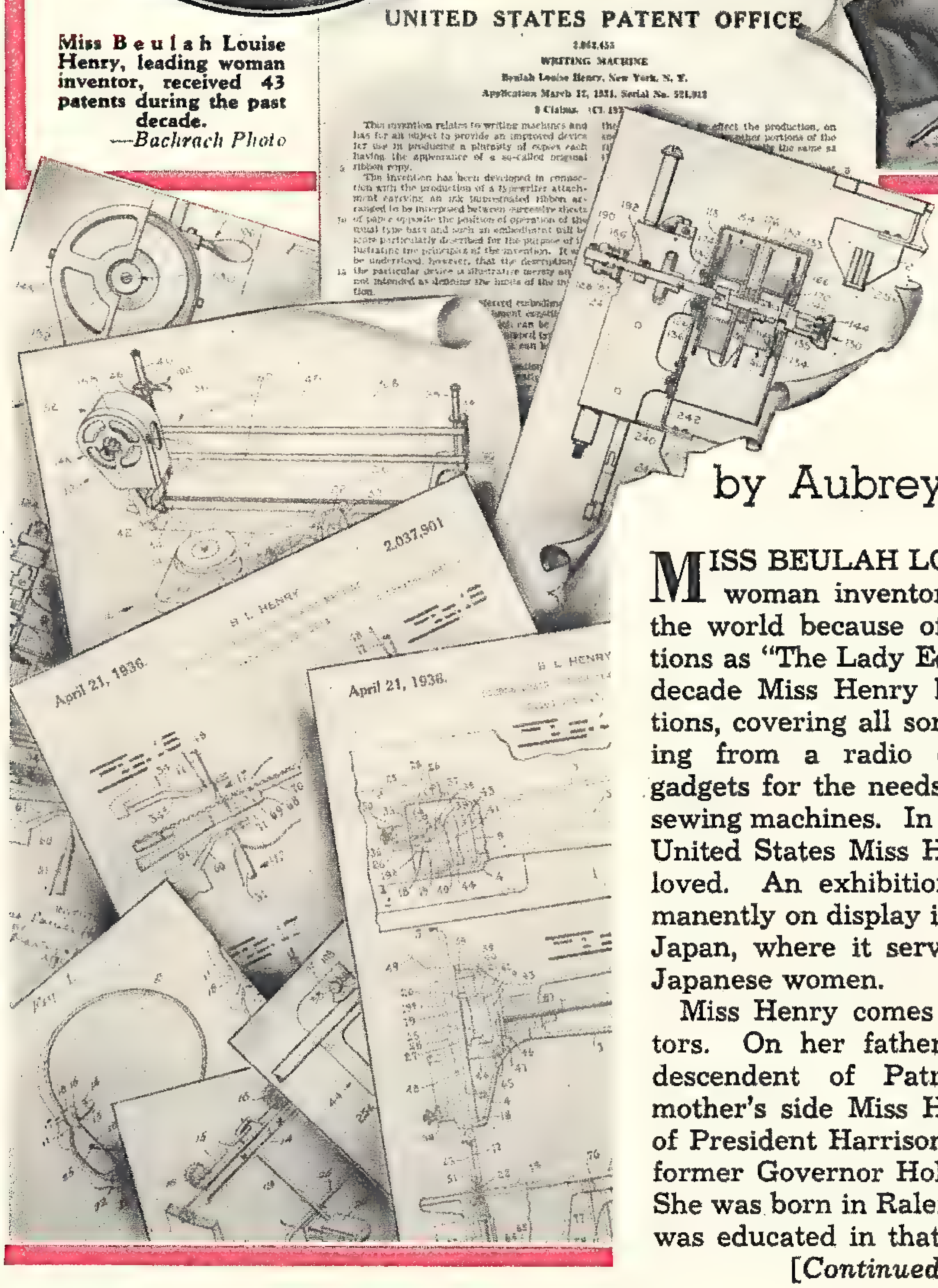


"The Flexible Clipper," ultra-streamlined bus, carries 20 passengers, and is powered by 78 h. p. engine. With safety glass throughout, de luxe chairs and down pillows are provided.

They Call Her "The Lady Edison"

Miss Beulah Louise Henry, leading woman inventor, received 43 patents during the past decade.
—*Bachrach Photo*





Left—Copies of but few of the many patents granted to Miss Henry during her short inventing period. Inventions include high speed sewing machine, toys, radio doll and typewriting attachment.

by Aubrey D. McFadyen

MISS BEULAH LOUISE HENRY, leading woman inventor, is known throughout the world because of her numerous inventions as "The Lady Edison." Within the past decade Miss Henry has patented 43 inventions, covering all sorts of new things, ranging from a radio doll, office equipment, gadgets for the needs of women, on through sewing machines. In Europe as well as in the United States Miss Henry is recognized and loved. An exhibition of her work is permanently on display in the museum at Osaka, Japan, where it serves as an inspiration to Japanese women.

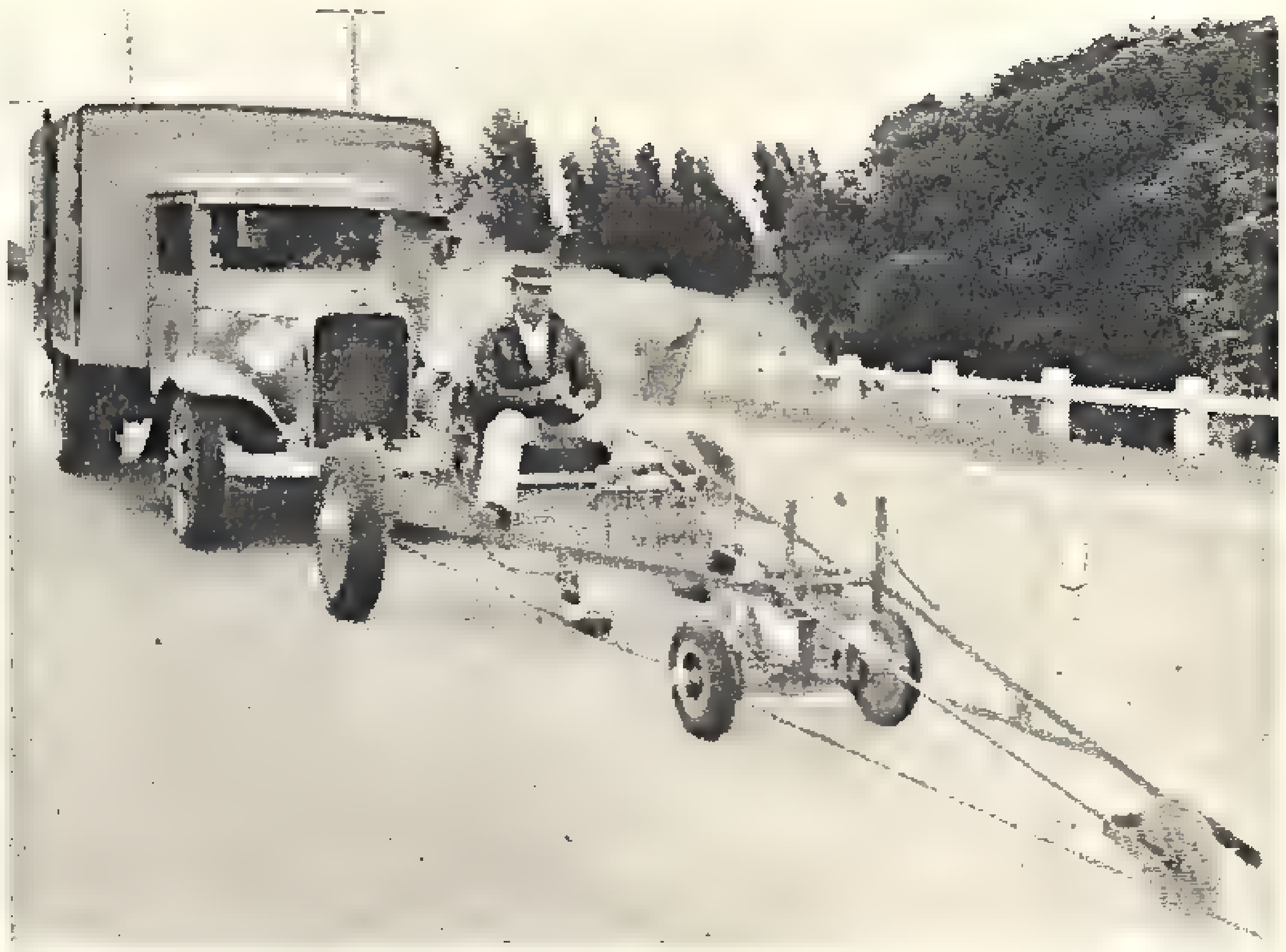
Miss Henry comes from illustrious ancestors. On her father's side she is a lineal descendent of Patrick Henry. On her mother's side Miss Henry is the descendent of President Harrison, and granddaughter of former Governor Holden, of North Carolina. She was born in Raleigh, North Carolina, and was educated in that state. She has been a

[*Continued on page* 147]

Highway Striper Paints 25 Miles Of Road A Day

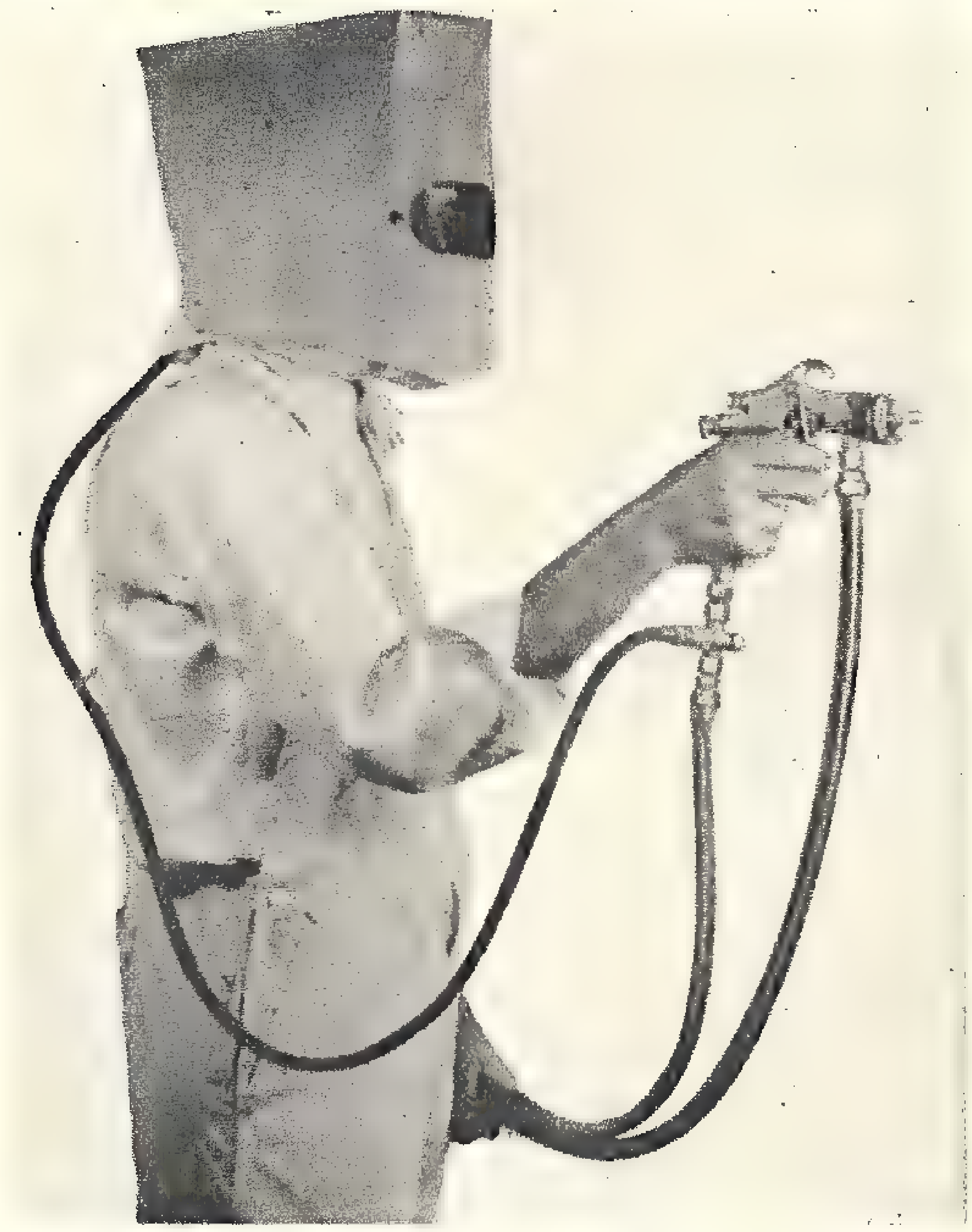
TWENTY-FIVE miles of white highway stripes may be painted in a day with the new device developed by the Equipment Department of the California Division of Highways. Propelled by a truck carrying a special lacquer paint and an air compressor for cleaning the pavement surface in advance of striping, the new unit does five times the work a corresponding number of men could do with the older equipment.

Some of the units have been equipped with a small pump which retrieves excess lacquer.



With this new equipment a crew of workers capable of painting five miles of highway in a day, now does 25 miles in the same time. The machine shown is being propelled by truck.

New Hood Protects Operator



A special protective hood which has no eye covering, uses the opening as a place for used and excess air to leave, thus preventing outside air from entering hood or approaching eyes.

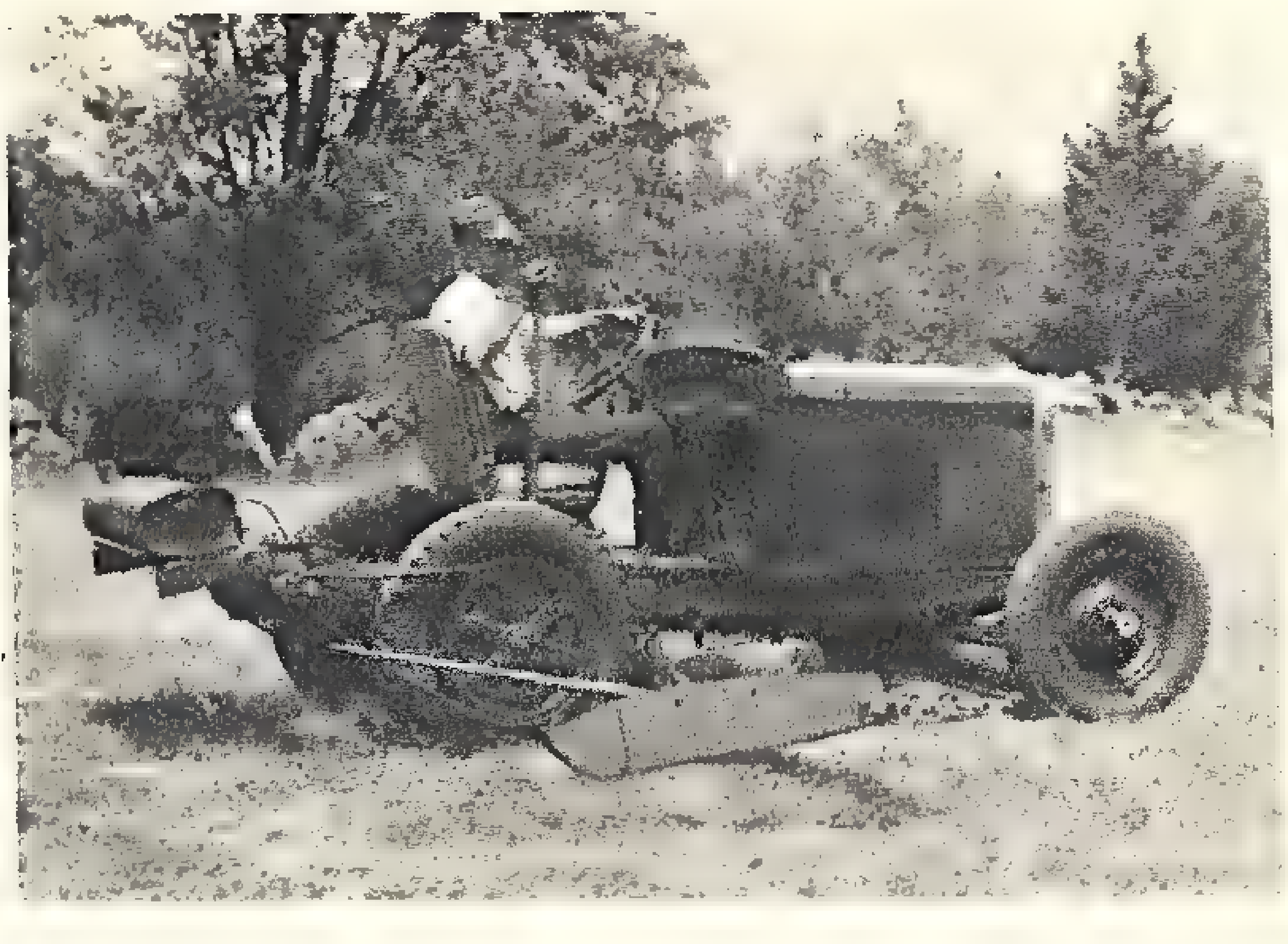
THIS new type hood respirator covers fully the head and neck of the operator and provides complete protection where ventilation is inadequate or where materials are present in the air which might prove harmful to eyes, ears or respiratory organs.

A fresh supply of air constantly is fed into the hood and flows out through the opening provided for vision, thereby preventing outside atmosphere from approaching the eyes or entering the hood. The unit is composed of a lightweight headgear, air filter and air hose which is connected to the air line by a special quick detachable connection.

Auto Becomes Power Mower

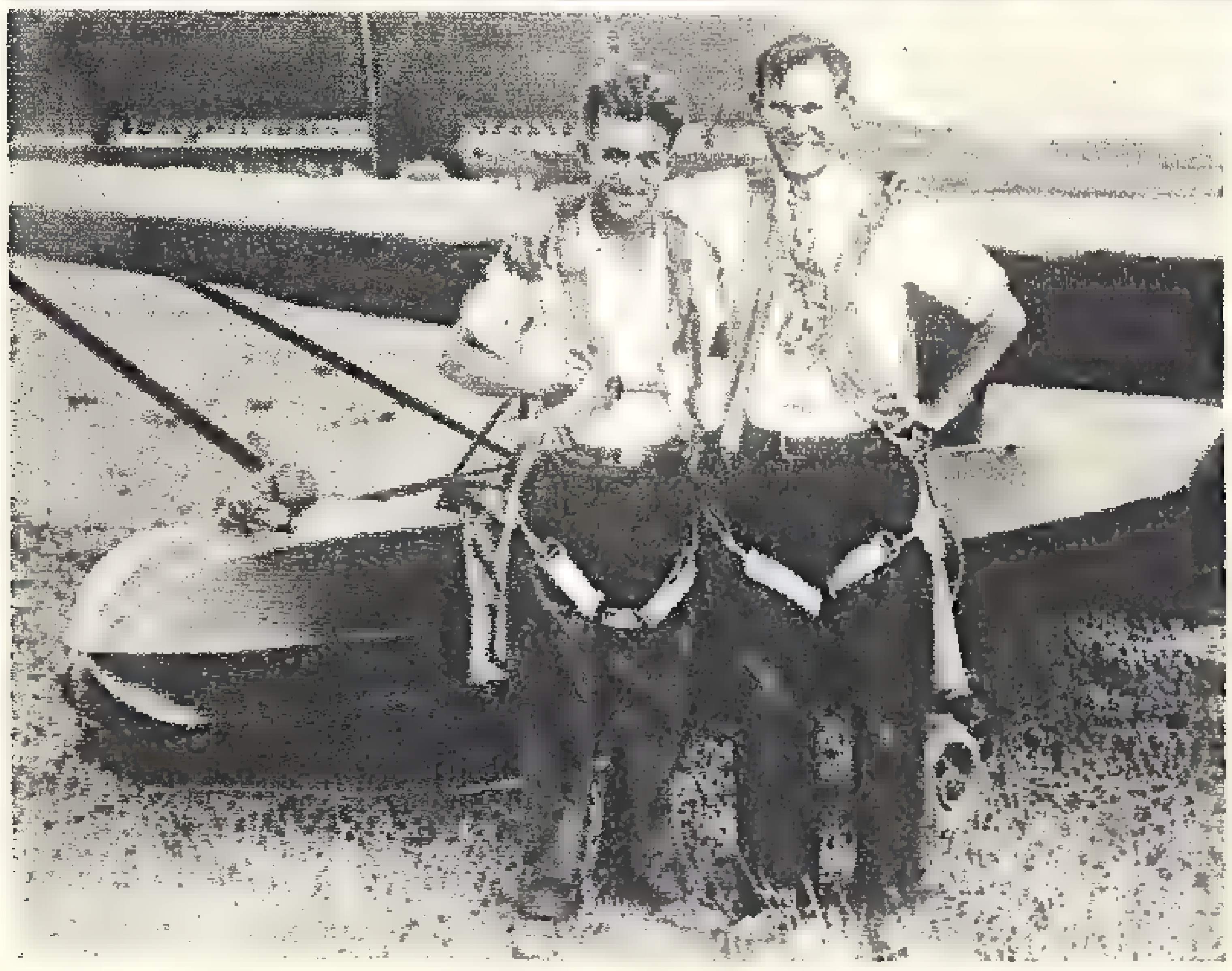
A HOMEMADE power mower, using a Chevrolet chassis and a rubber tired mowing machine, was constructed by William Neidner, owner of Rosewalled Farms, Hillsboro, N. H. The car differential is shown just in front of the gas tank at the rear of the car. The ends of the differential axle are fitted with small sprockets which in turn are connected to larger sprockets attached to the outside of the mowing apparatus tires.

Having a short wheelbase, the machine is easily controlled. Because it operates in high gear most of the time, it is said to be very economical. At Rosewalled Farms all work is done either by electric or gasoline power. Mr. Niedner has purchased several old farms and has been developing them by use of modern machinery. Roses have been planted on stone walls, thus giving the farm its name.



A Chevrolet chassis was converted into the power mower by William Neidner, owner of Rosewalled Farms, Hillsboro, N. H. Because it travels mostly in high gear it is very economical.

Brothers Build Plane Powered By Hybrid Engine



Using parts from several auto engines and radio sets, Joseph and Howard Funk, glider pilots of Akron, Ohio, constructed the high wing monoplane shown in upper photo.

POWERED by an engine consisting of parts from several autos and designed primarily for reliability and low construction cost, a two-passenger monoplane has been developed by Joseph and Howard Funk, of Akron, Ohio. Engineering experts are said to have been favorably impressed with the stability and performance of the plane.

The aircraft is of the high wing braced type. Fuselage, landing gear, and tail units are constructed of seamless steel tubing, but the wings have wooden spars and ribs. Fabric covering is used on the wing and control surfaces. The brothers built the plane in one year during their spare time.

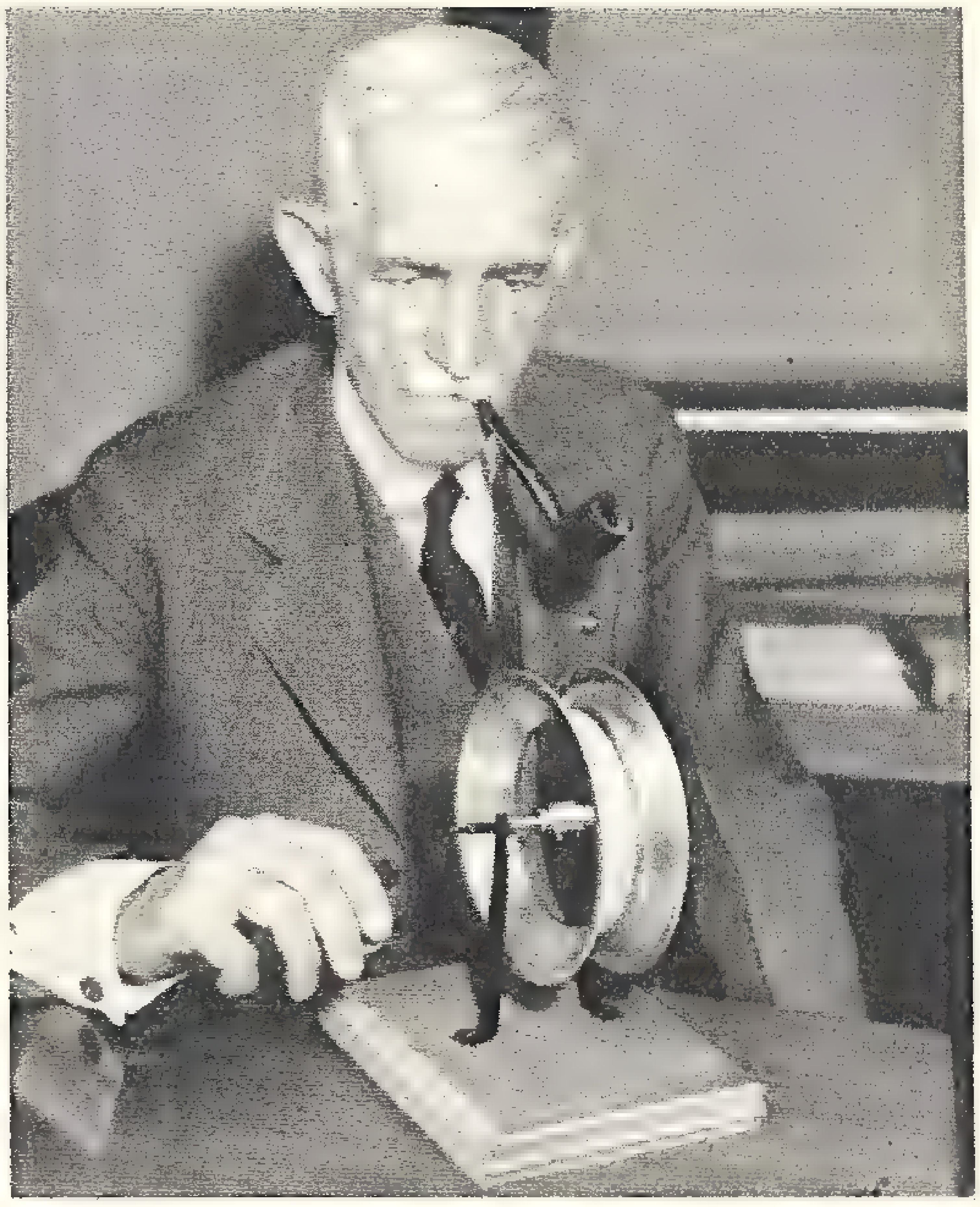
Compact Velometer Devised

A TUBE-TYPE velometer that indicates air velocities directly on a scale without the necessity of timing or any mathematical calculations has been developed by experts of a Chicago testing laboratory. Compact in size, the meter can be used to take readings in places inaccessible to other means.

The mechanism is housed in a black molded plastic case, 5¼x5¾x2⅜ inches in size and weighs approximately two pounds. In operation, the tube is held at the point where air velocity is to be tested and the air entering the meter actuates a vane to which a pointer is attached. A graduated scale on the face of the meter gives the velocity reading as indicated by the swinging pointer. The velometer is claimed to be accurate to within three per cent of its full scale readings.

This tube-type velometer measures the velocity of the air streams in which tube is placed.

Pie Pans Make Drying Reel

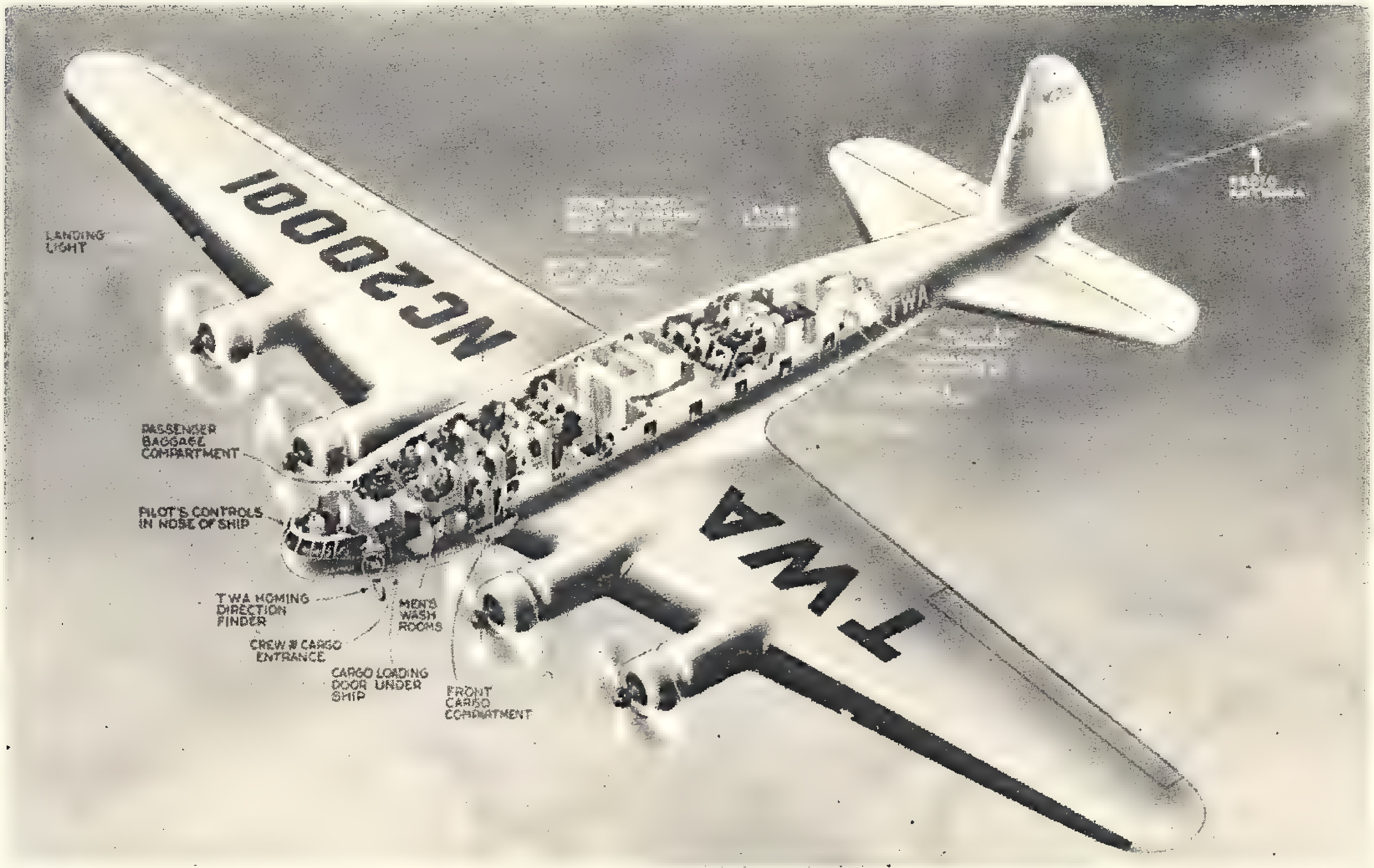


To keep his fly casting lines in good condition, F. L. Scott, of St. Louis, Mo., constructed this novel reel from two pie pans. Reel exposes more line for drying.

CONSISTING of two pie pans separated by a wooden spool, a novel handle-operated reel for drying fly casting lines has been devised by F. L. Scott, of St. Louis, Mo., an ardent fisherman.

The reel enables more of the casting line's surface to be exposed to the air, thus insuring quicker and more thorough drying of the line.

LARGEST U.S. AIRLINER ORDERED


NC20001
TWA
LANDING LIGHT
PASSENGER BAGGAGE COMPARTMENT
PILOT'S CONTROLS IN NOSE OF SHIP
TWA HOMING DIRECTION FINDER
MEN'S WASH ROOMS
CREW & CARGO ENTRANCE
CARGO LOADING DOOR UNDER SHIP
FRONT CARGO COMPARTMENT

The largest passenger plane in the United States, powered by four 1,205-horsepower engines, has been ordered, and is expected to be placed in service next spring. Carrying 32 passengers, the monster ship will be capable of 250-mile-an-hour speed at 20,000-foot altitudes. Cabins are designed for supercharging for high altitude flying. Ship weighs 42,000 pounds.

CONSTRUCTION work on what will be the largest airplane to go into service in the United States, has been started for Transcontinental and Western Air, Inc.

Six of the new ships will be built at a cost, including spare equipment, of $2,043,000, and an option on 17 additional planes of the same type has been taken.

The transports will be equipped with berths for 18 persons and seats for eight when flown on night schedule and with 32 seats when operated as day planes. In addition, cargo space for 3,750 pounds is provided.

The passenger cabins of the new planes are structurally designed and built for supercharging. When cabin pressure equipment is added, TWA expects to fly the planes at 20,000-foot levels. At the higher cruising levels the new ships will fly at about 250 miles an hour.

Simultaneous with the announcement of the purchase of the new planes, Jack Frye, president of TWA, announced that TWA has ordered 36 additional Wright G-100 heavy duty Cyclone engines to power the ships. Capable of producing 1,205 horse-power, the new Cyclones are the most powerful air-cooled radial engines in production in the country. These engines are the same as those now being installed in TWA's Douglas airplanes now nearing completion in California. Installation of four of the Wright G-100 Cyclones in the new TWA Boeing plane will give the ship a total of 4,820 horsepower.

In all, the 77 Cyclones now on order for TWA will be capable of producing 92,785 horsepower.

In the announcement of TWA's order, Mr. Frye stated:

"The purchase of these planes which will be the first of the modern four-engined transports to go into service in this country, is a step in the general expansion program being undertaken by TWA.

"In all, approximately $4,300,000 is being spent by the Company. The new Boeing fleet, together with spares and equipment, will cost approximately $2,043,000. Other funds are being expended for other two-engined equipment, for research and development and for improvement of ground facilities."

Concerning the new Boeings, Mr. Frye said:

[*Continued on page* 150]

SPORTSMEN'S
PROPER ACCESSORIES

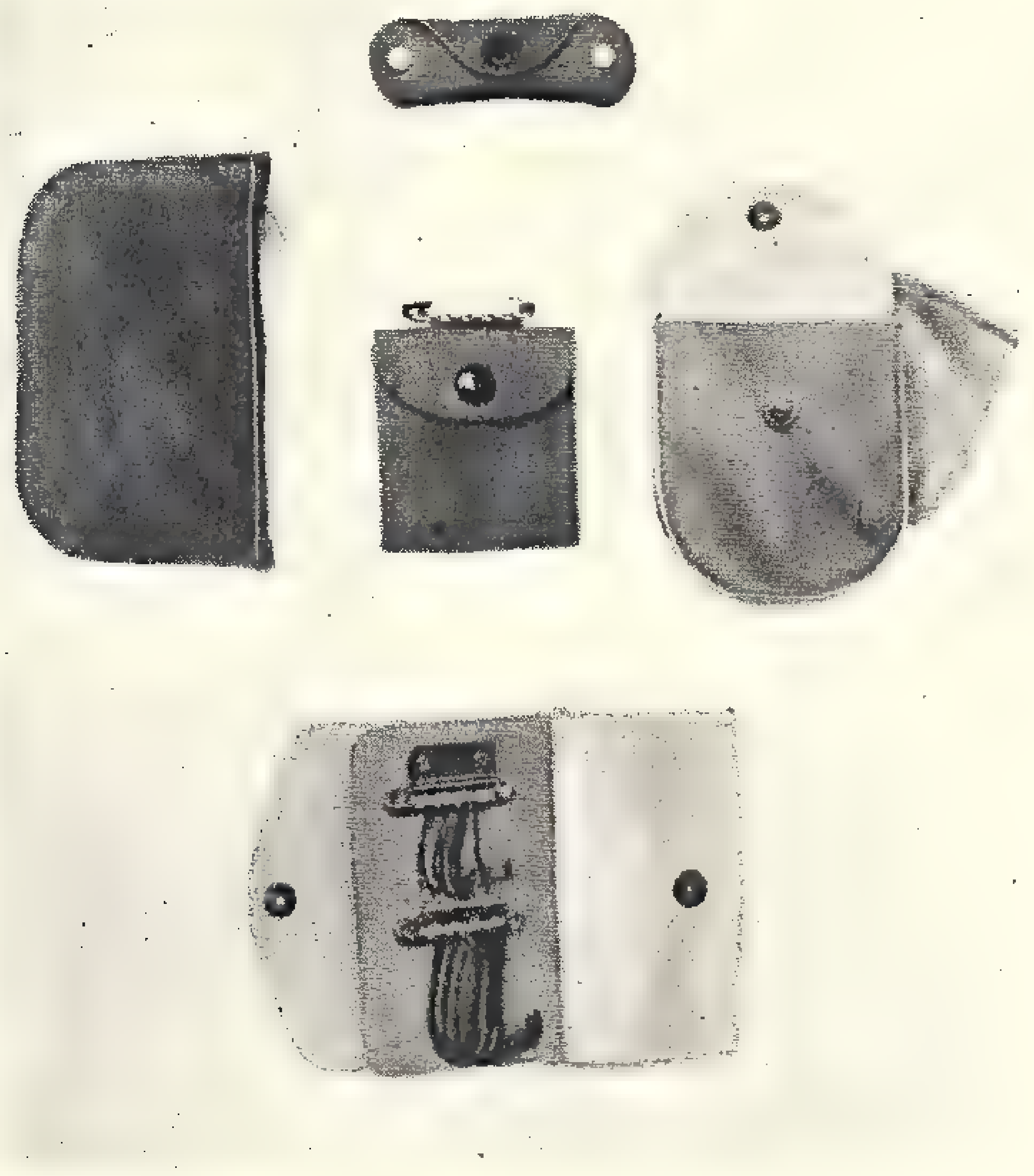
by Robert Page Lincoln

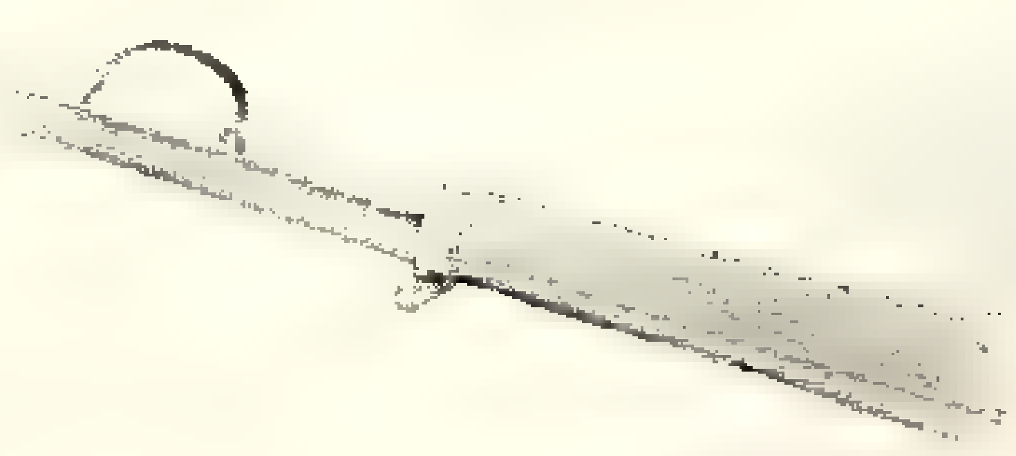
Success of a fishing trip depends as much on accessories as the scene and the fish. Care in planning brings rewards.

WRITERS on fishing invariably devote themselves in their essays to voluminous accounts regarding tackle habits of the trout, and this, that or the other. When, however, it comes to writing with regard to the clothing and like necessities to use, they pass the subject by merely as an afterthought.

Obviously the success of any trip depends upon the physical well being, proper bodily protection and an ability to master the elements. Instead of being shoved to the back of a book it should occupy first place. That there are colds and all manner of ailments contracted annually on trout fishing and other trips is rather proof that less consideration is given clothing and like particulars than any connected with the pastime. How much better it is to go well equipped to take care of your health and at the same time be able to wade successfully any portion of a river or stream that is reasonably negotiable.

Unlike in other departments of the piscatorial game, trout fishing calls for the use of either hip boots or so-called wading trousers, the same being picked according to the stream that you are to fish. Generally most streams are only comparatively deep and may be waded using hip boots. Others are a different proposi-





Hook and sinker kits keep the fisherman's weapons in order. At right is a leather rod case.

Waterproof clothing sometimes means the difference between a thrill and a chill for the spring fisherman.

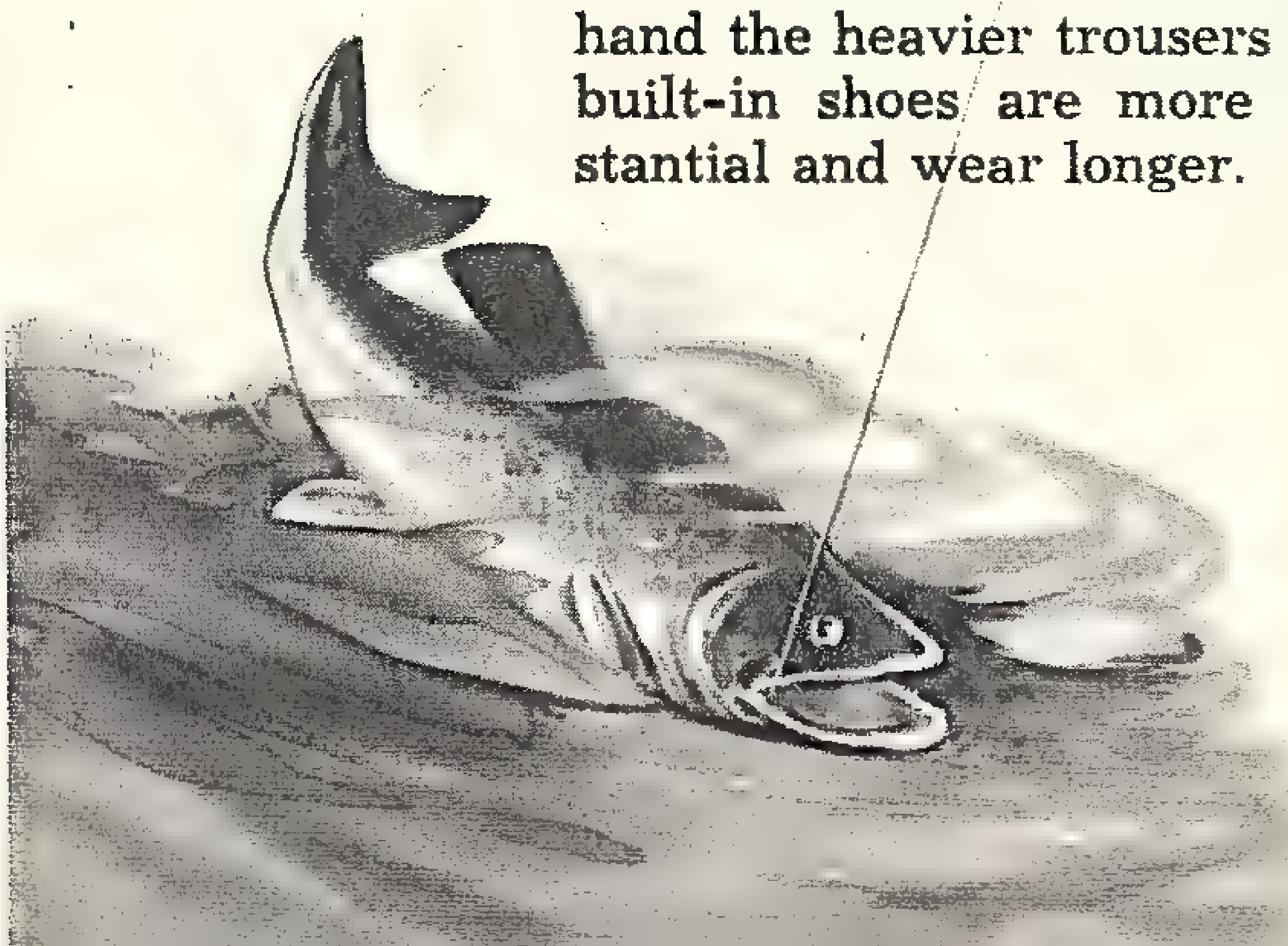
CAMPFIRE
FOR TROUT FISHING

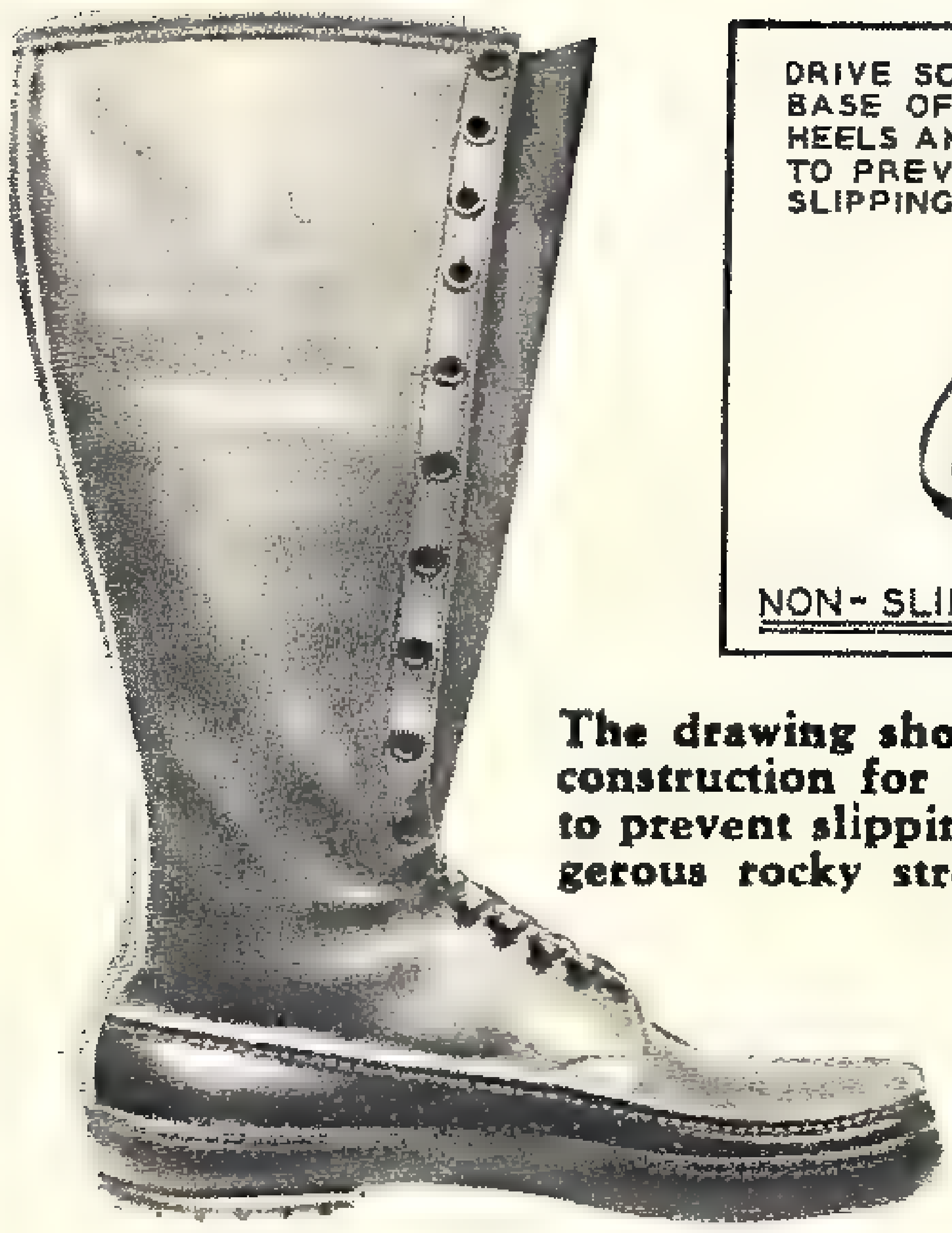
tion altogether, presenting fairly deep water that would go over the tops of hip boots. In such streams the wading trousers that come up to under the waist are most desirable, in fact are almost a necessity if one is to get the most out of a wading stream. The fisherman who has come upon a stream of the sort using hip boots only to find that time and again it has been impossible to wade across to a certain point; to reach a mid-stream location, or otherwise has found himself halted by reason of boots that would or could not "take" it, knows eventually just how invaluable wading trousers are in a case of the sort. This is not to say that even wading trousers are equal to each and every situation, but it is certain that two-thirds of the streams that cannot be fished when using hip boots will be successfully circumvented by the use of wading trousers.

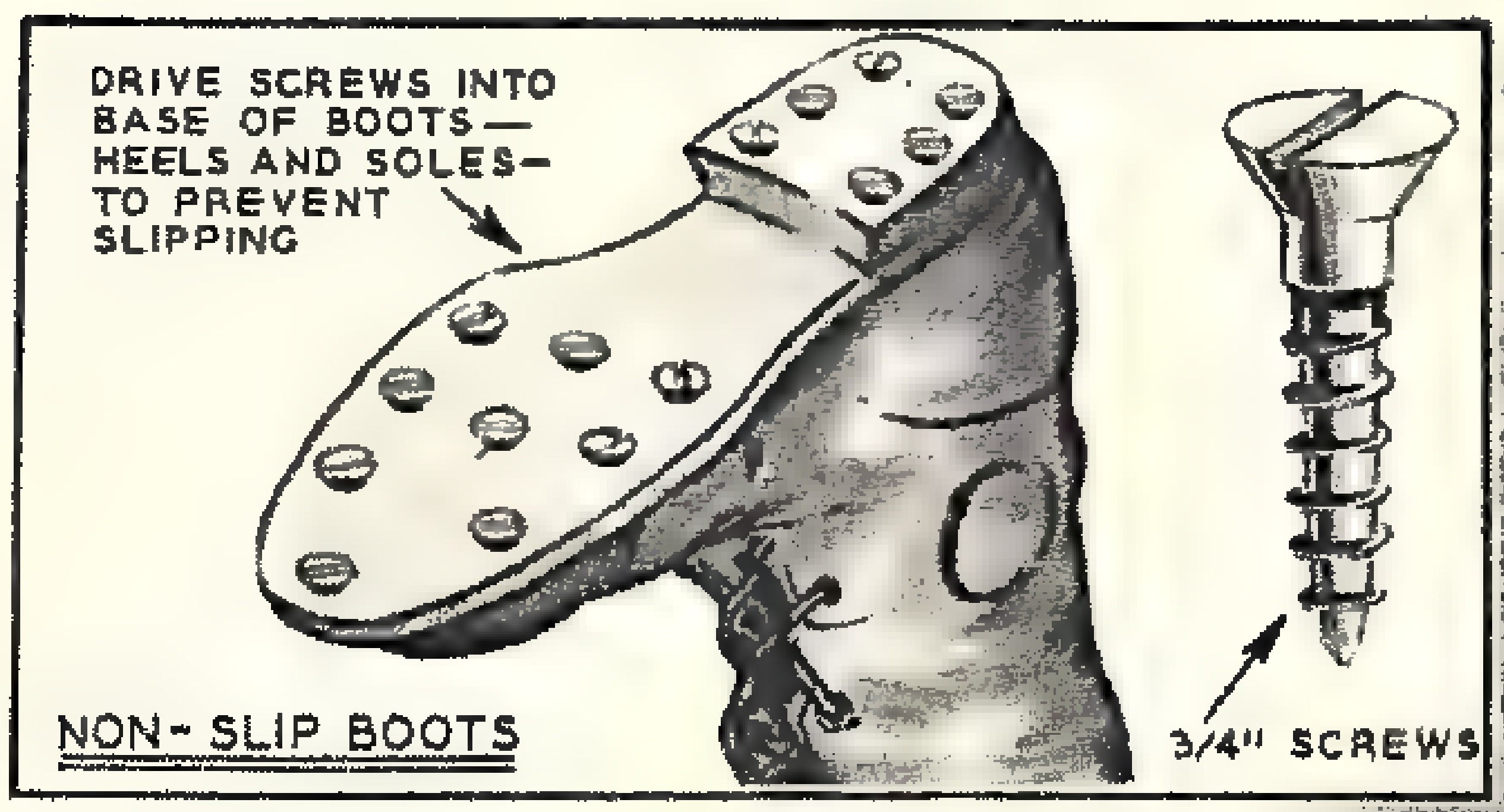
Wading trousers come in two types, the heavier one with the built-in shoe and the so-called feather-weight or light-weight waders (trousers) which have no built-in shoe on which are worn leather wading shoes or brogues that slip on over the so-called "stockinged" feet of the waders. While there are good points scored for each type of these wading trousers, it can surely be said that the light-weight trousers are the best, where lightness, ease of wearing and transportation are concerned. These light-weight trousers, in the wading class, can be rolled up and tucked away in a packsack to take up but little room. The heavier type, with built-in shoes, are not so easily carried, and are by far more clumsy. On the other hand the heavier trousers with built-in shoes are more substantial and wear longer. Two years is just about the life of a light-weight wading trousers, that is, if used a great deal.

Brogues or shoes used for wading are generally fitted out with heavy soles. If not to be had as the shoes come, a shoemaker can apply these with ease, making them upwards of an inch thick. The bottom of these are set with hobnails, so arranged that they will best grip the rocks on the bottom of the stream. Hobnails, while useful, are not entirely successful in that they will wear

Sheepskin hatbands like the one at the left are a helpful accessory for the fly fisherman. The fly lures are hooked into the band for instant selection.



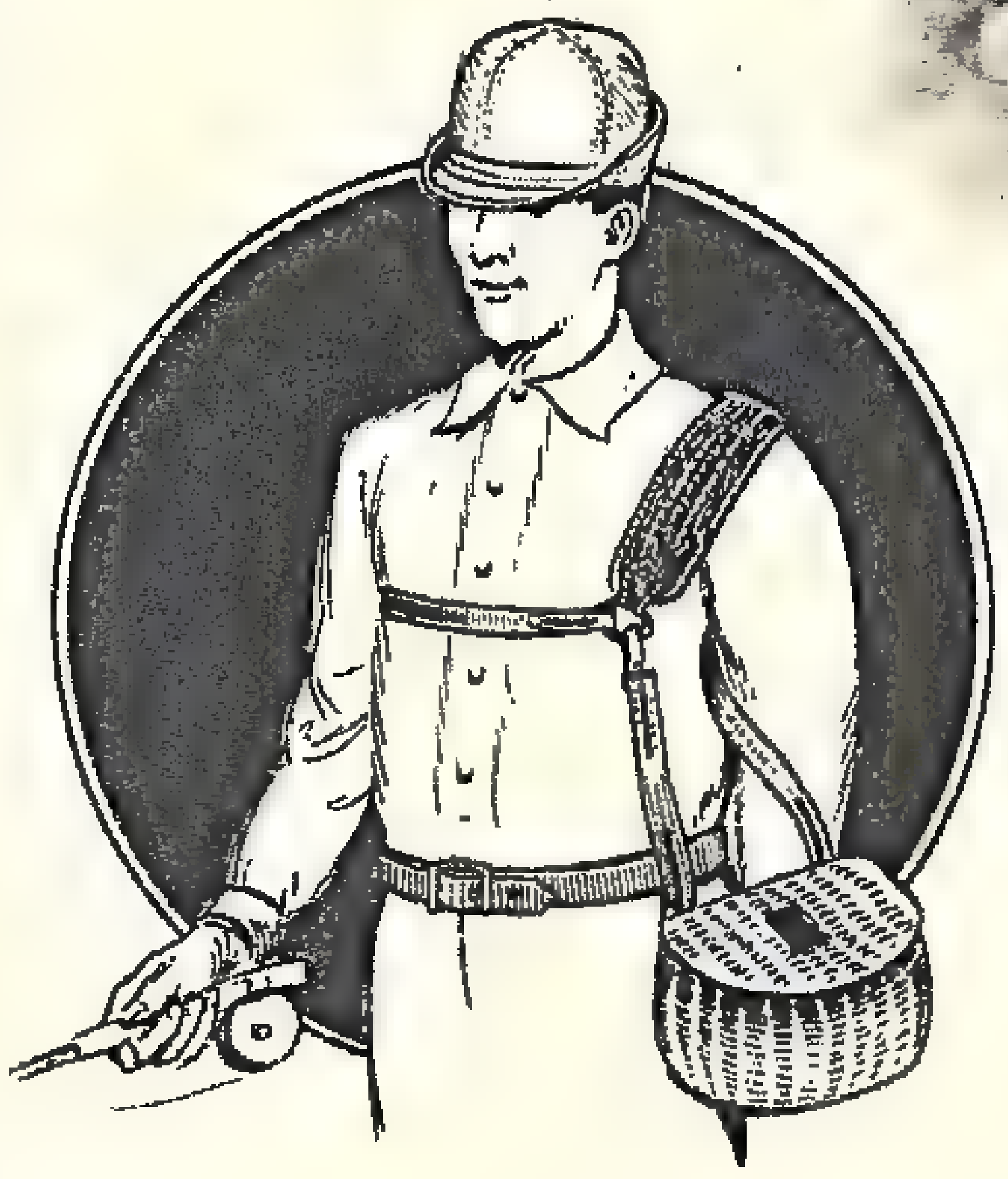



DRIVE SCREWS INTO BASE OF BOOTS— HEELS AND SOLES— TO PREVENT SLIPPING
NON-SLIP BOOTS
3/4" SCREWS

The drawing shows special construction for boot soles to prevent slipping on dangerous rocky stream beds.

Light weight ankle boots which terminate below the knee and allow much freedom are popular with many fishermen who like to wade trout streams.

Here is a well-equipped fisherman in action. Note creel harness and boots.



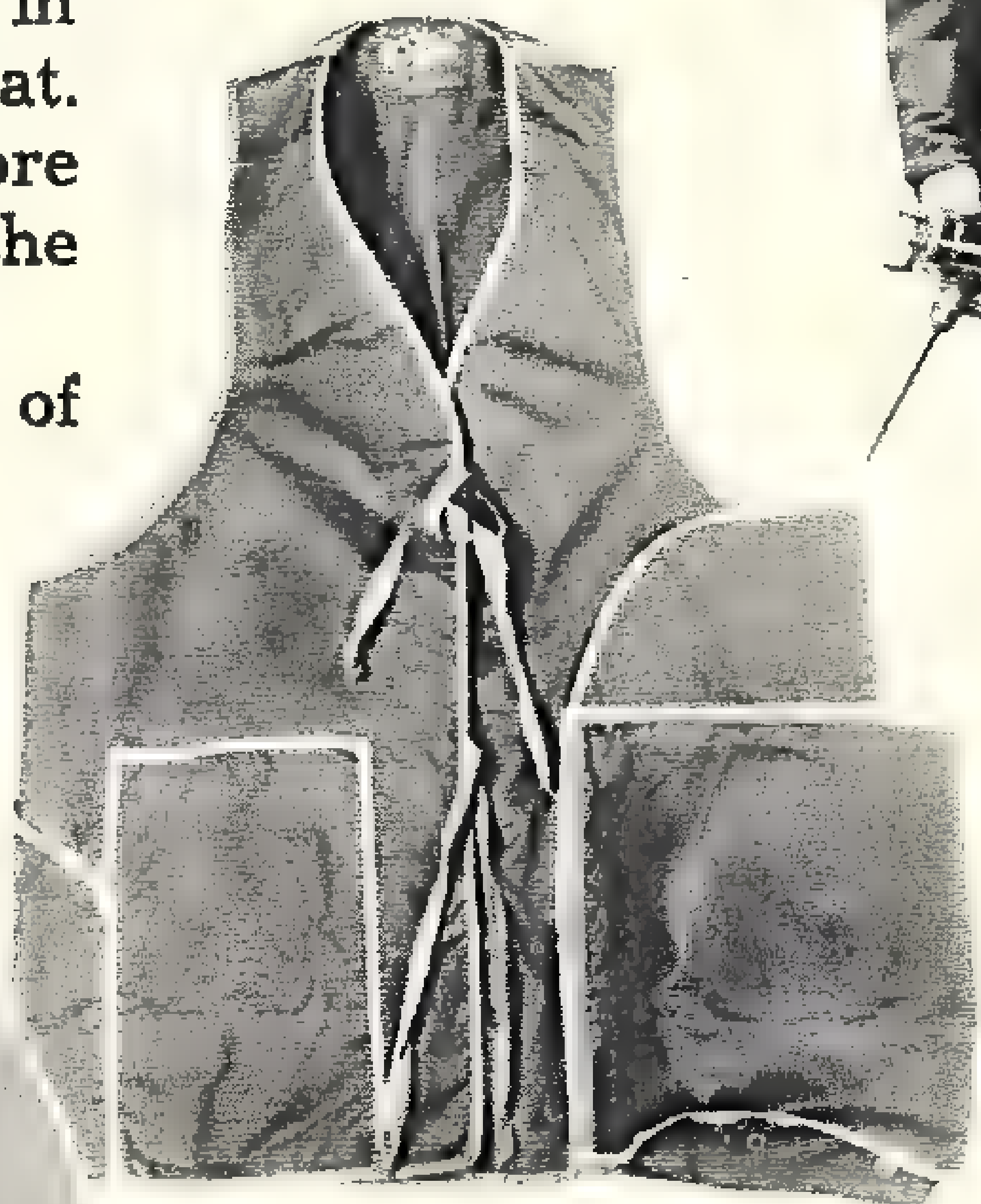
Creels with shoulder harness like the one shown at left permit complete arm freedom while casting line.

down. Even better than the hobnails are three-quarter-inch long wood screws, with sharp edges that are turned in to stand out a quarter of an inch and so arranged over the area of the sole as to make for a good grip on the rocks. These screws should not be so close together that they do not form contact with the slimy cobbles, otherwise the purpose of the idea is quite lost. The sharp edges of the screws cut into the slippery rocks and hold, where the rounded hobnails are likely to slip. If these screws are set in old or worn leather they are likely to be but poorly held in place and are apt to tip over under rough impact. They should be set in new leather soles, which same, being tough and hard, will hold them secure in their up and down position and will not turn when pressure is made against the rocks.

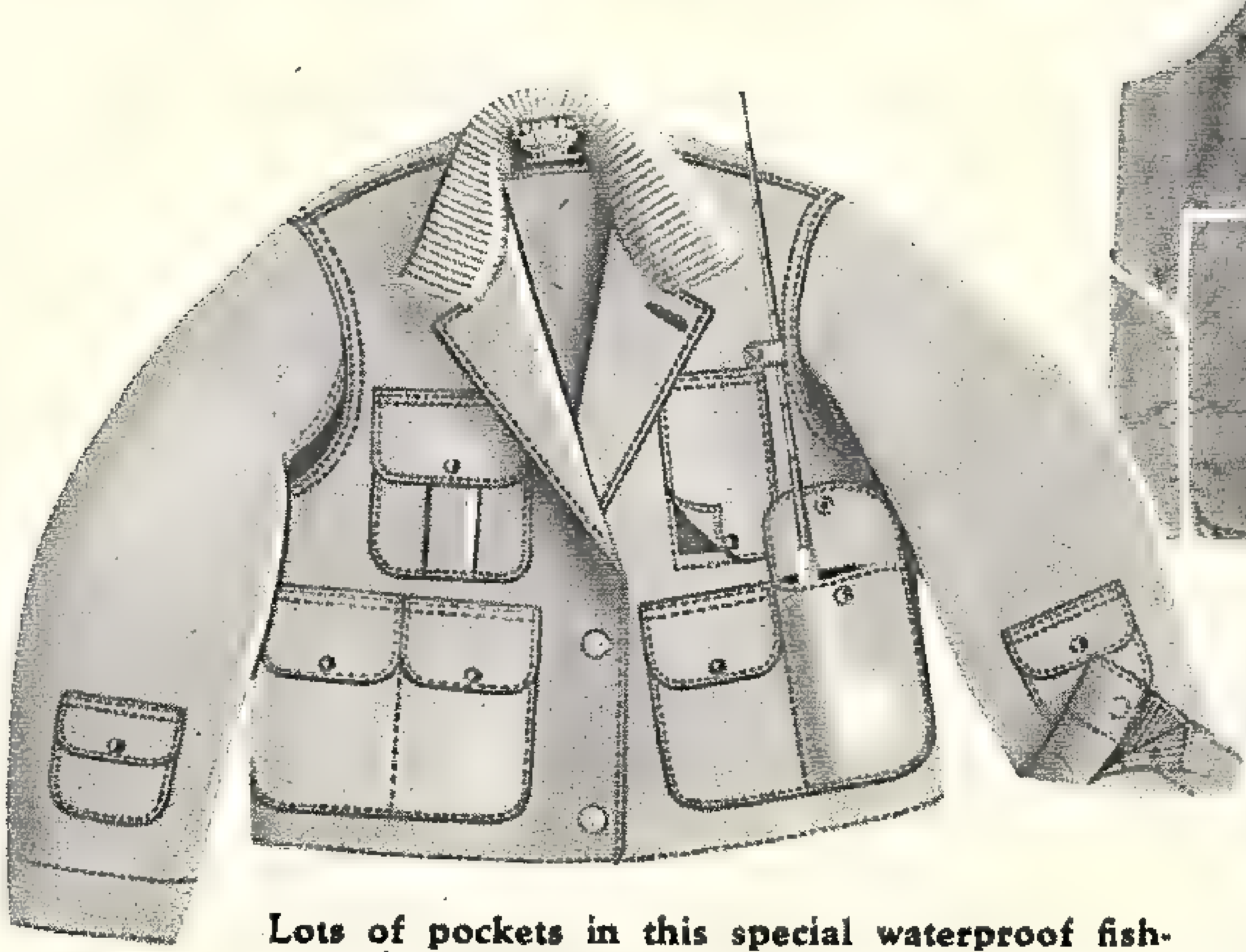
Where wading shoes or brogues are used outside of wading stockings or the featherweight trousers mentioned, there is need of protection for the wading stocking that covers the foot. Therefore, it is necessary to pull on two pairs of wool socks over the stocking after which it is inserted in the wading shoe. This forms a protection between the stocking and the shoe that will prevent wear. Inside of the stocking another two pairs of socks are used, thus involving the use of four pairs of socks. While this will seem a lot of socks, it should be remembered the trout water, whether in the summer or spring is likely to be ice-cold. With the sufficient number of socks stated one will find himself comfortable at all times, and will stand not the slightest chance of incurring a cold. It should be remembered that a clammy foot in a pair of hip-boots will be likely to invite a cold as well as walking barefooted in the water. This is something that is rarely given any attention. Since many colds come from the feet, the protection that must necessarily be accorded them should be as complete as possible.

Wading trousers (or wading stockings as they are also called), have need of strong suspenders to hold them up. They are but fairly tight to the body. Some years ago there was considerable propaganda put out against these wading trousers, the statement being made that they were dangerous. If the fisherman got out into mid-stream and was swept off of his feet, or got into a deep hole, these trousers would fill up with water, and would then pull the fisherman down, resulting in death by drowning. So few, if any, have these drownings been that they are to be dismissed without second thought. The chances of drowning in a pair of wading trousers on 90 per cent of our American trout streams is extremely narrow. Undoubtedly, in fishing a real swift stream, in which one has difficulty in standing on one's feet, there would be some risk, but the same risk would be incurred fishing with hip boots or even when fishing in the "soaking wet" style, where no boots are used, just the hobbed shoes. The fact remains that the wading trousers are well nigh invaluable, and assures one the opportunity of fishing places in streams that otherwise cannot be got at. While these waders cost considerably more than the hip boots they are well worth the added difference.

This Yale hat and similar types protect the head of the fisherman from the weather and are also popular for any other kind of outdoor activity.



This lightweight waterproof vest is designed to protect the sportsman without impeding his movements. The sportsman at the right is wearing a burr-proof and mosquito-proof buff horsehide garment and carrying one of many folding kits on the market that serve well to carry lures, hooks, line, etc.



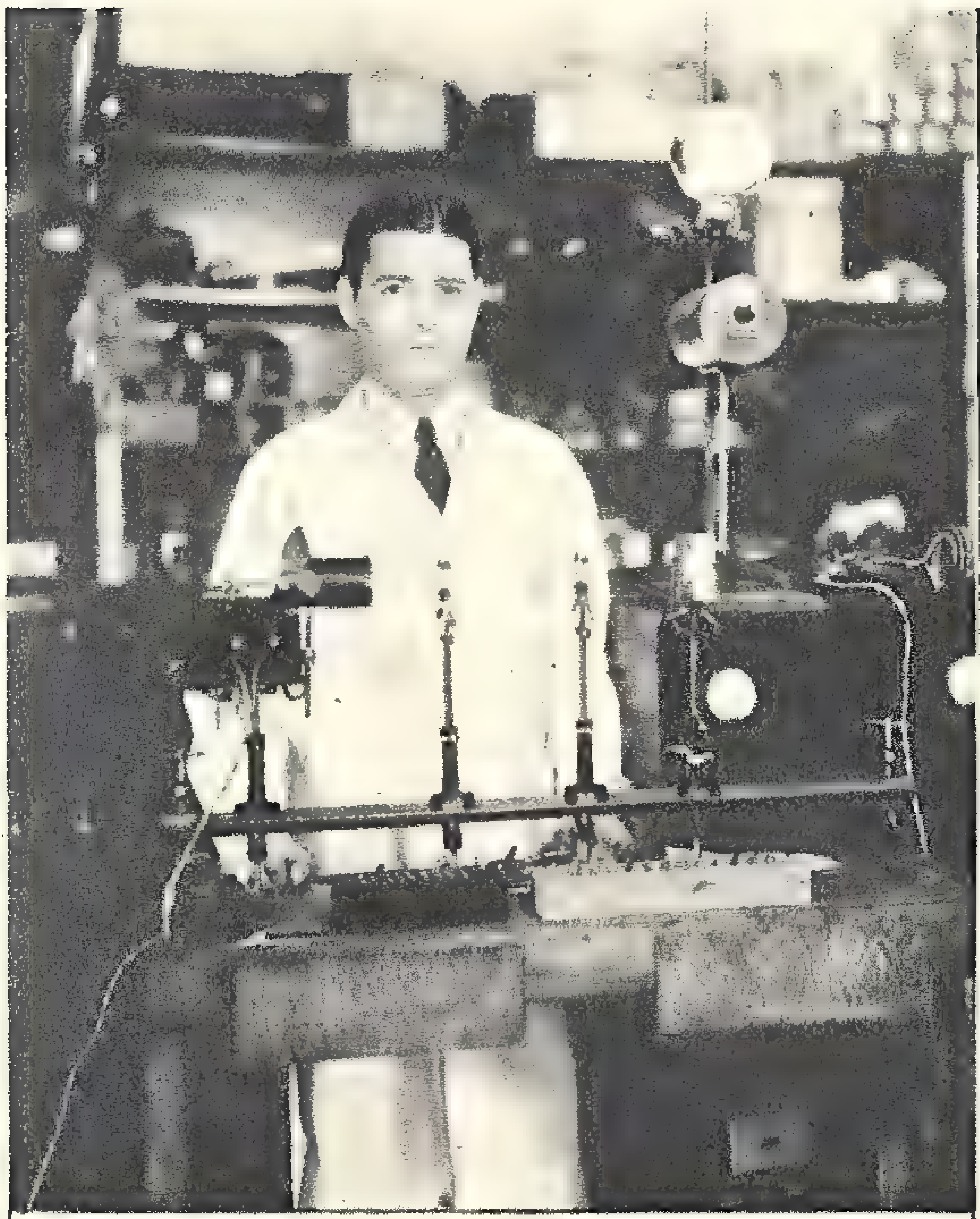
Lots of pockets in this special waterproof fisherman's wading coat provide room for tackle.

Hip boots accompany about 75 per cent of the trout fishermen on their annual trips, regardless whether they permit one the opportunity of covering all stretches of water or not. The oldtime boot used in trout fishing was little short of a trial when worn. Many of these were in the heavy, ditching boot type. They were hard to wear and invariably wore blisters on the heels, toes and sides of the feet, which were caused by the boot foot being too stiff to bend with the foot. In other words the foot would bend but the boot would not, thus forming a wear of the boot against the foot. Present-day hip boots are now made in a light-weight material, so soft and merging with the movements of the foot as to surprise one. Such boots are extremely easy on the foot, and, worn with a pair of wool socks, possess everything that is needed in wading efficiency. They are so light and are made of such featherweight material that they may be rolled up in a small bundle to take up but little space. New innovations in these rubber boots of the hip variety involve buckles that connect over the instep of the foot, this holding the boot in place on the foot. If pulling the boot out of the mud, it will come up without being left in the same. Fishermen who have had misfortunes of the sort will appreciate the value of this inventive item.

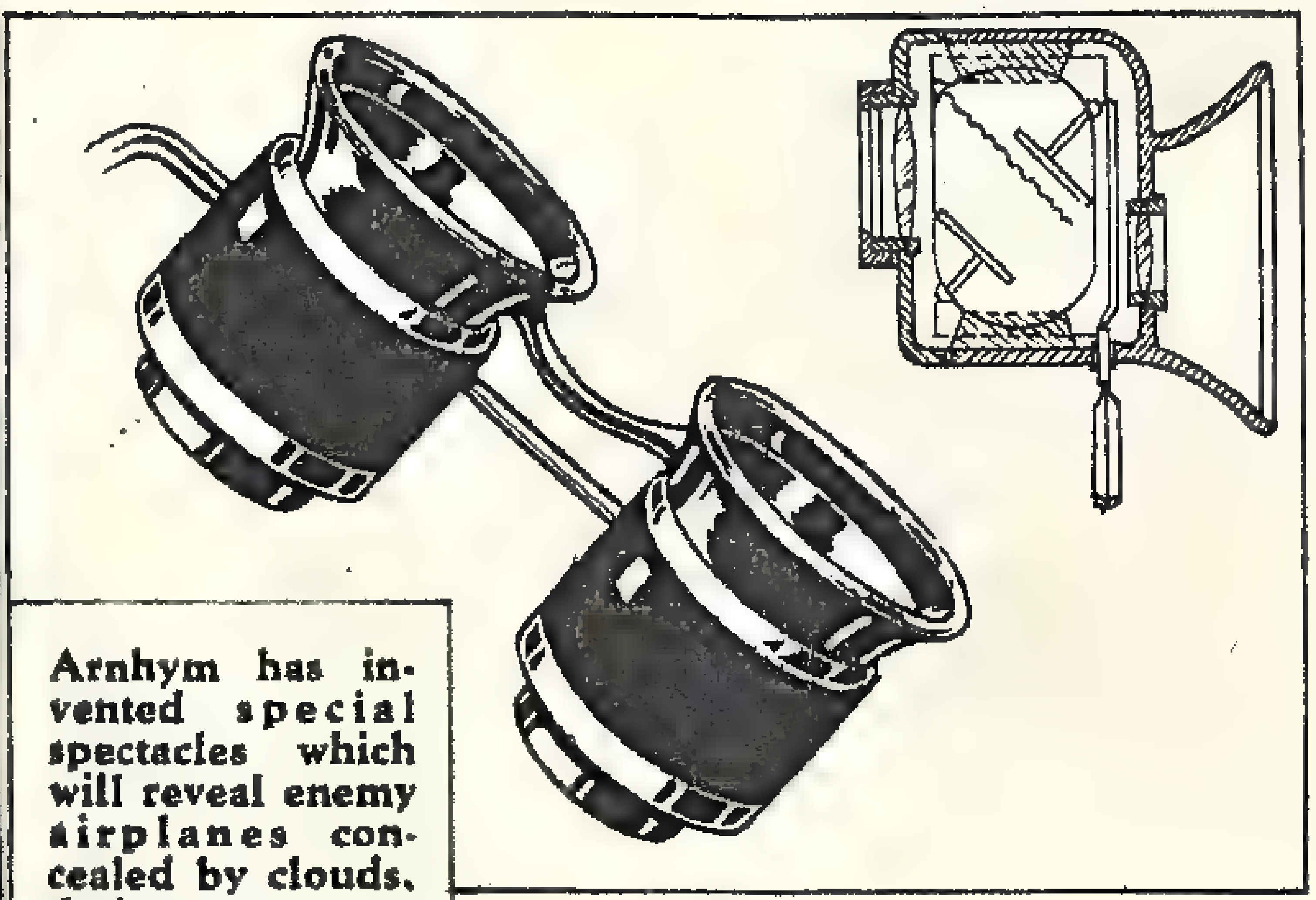
Newer type rubber boots have various non-slip features, the chief invention in this line being a rubber boot with a sole to which you may affix hobnails. This is no less than a stroke of invention wrapped up in one package. Corrugated and cleated soles are interesting additions to boots, also ankle-fit features that make such boots more comfortable on the foot. Other recent additions to the line of boots that are useful not only for the trout fisherman but all fishermen as well, are the so-called ankle boots that reach up some 16 inches or so on the leg. These have no tops like in the hip boots. They terminate below the knees. They are light in weight and incorporate all the features demanded in a short boot. They are used in fishing along brushed-in streams, through

[*Continued on page* 116]

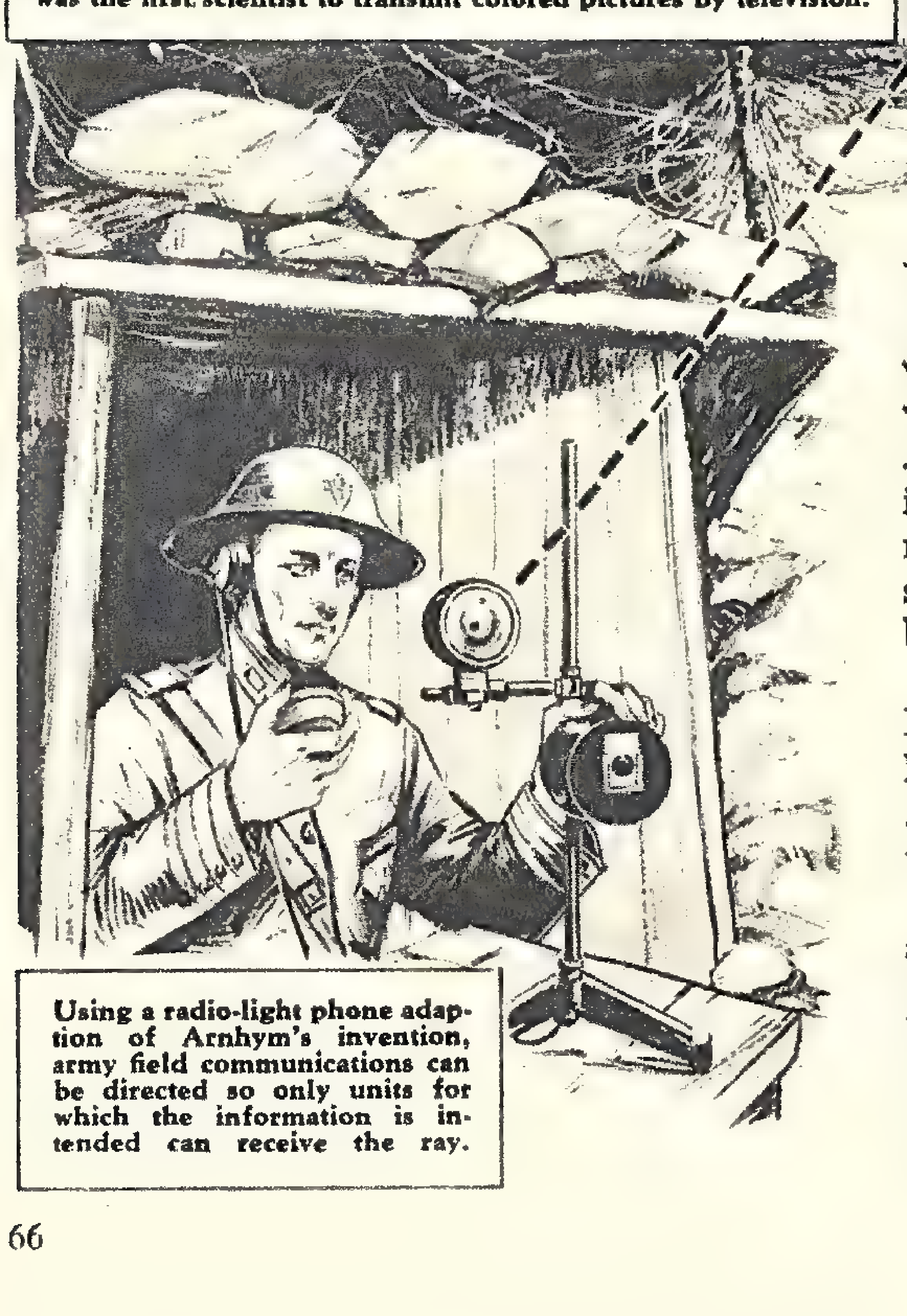
Spectacles Pierce Fog And Haze



Albert A. Arnhym (above), young scientist of Chicago, Ill., has patented an invention for converting invisible infra-red and ultra-violet rays into visible rays. Arnhym was the first scientist to transmit colored pictures by television.



Arnhym has invented special spectacles which will reveal enemy airplanes concealed by clouds, darkness, etc., or help motorists to safely travel fog blanketed roads. Sketch shows construction details.



Using a radio-light phone adaption of Arnhym's invention, army field communications can be directed so only units for which the information is intended can receive the ray.

WORN like ordinary eye glasses, special spectacles designed for converting invisible infra-red and ultra-violet rays into visible rays have been invented by Albert A. Arnhym, a Chicago, Ill., scientist. Since infra-red rays penetrate fog and ultra-violet rays pierce darkness, persons wearing the spectacles can see objects hidden by these barriers.

The spectacles have many practical uses. In war time they would reveal enemy planes hidden in clouds. In peace time, motorists and ship captains will be able to steer safely through fog and haze.

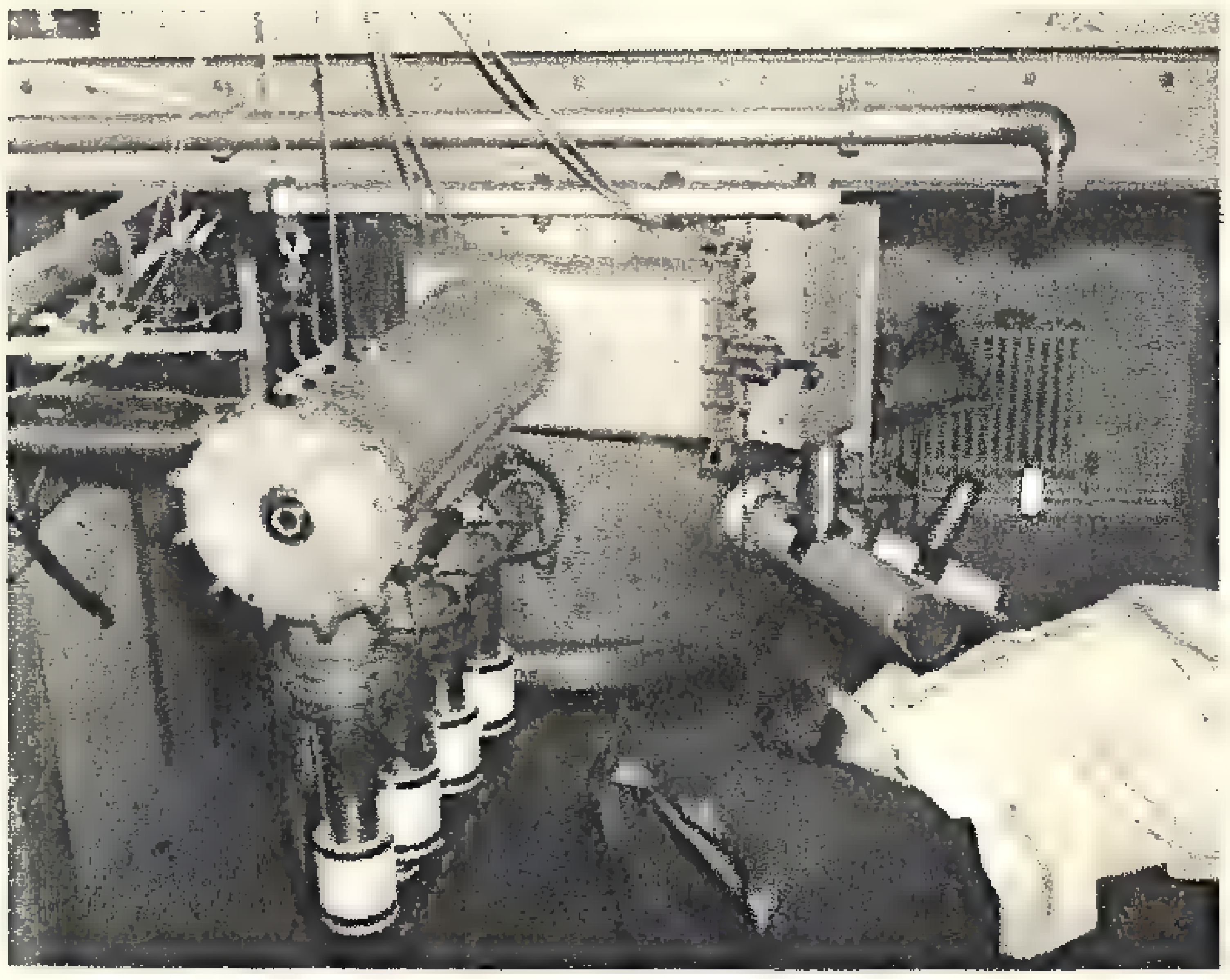
A military adaptation of the young scientist's invention, enabling messages to be sent over a radio-light phone, will be tested by the Illinois National Guard this summer. Message rays sent by the Arnhym system, it is claimed, can only be received by the unit to which they are directed, thus insuring secrecy.

Powerful X-ray Machine To Aid Cancer Research

THE most powerful X-ray machine in the U. S. has been installed at the Cancer Research Institute of Columbia University in the Presbyterian Hospital at Medical Center, New York City. Capable of developing 1,250,000 volts, the apparatus produces radiation equal to 100-million dollars' worth of radium.

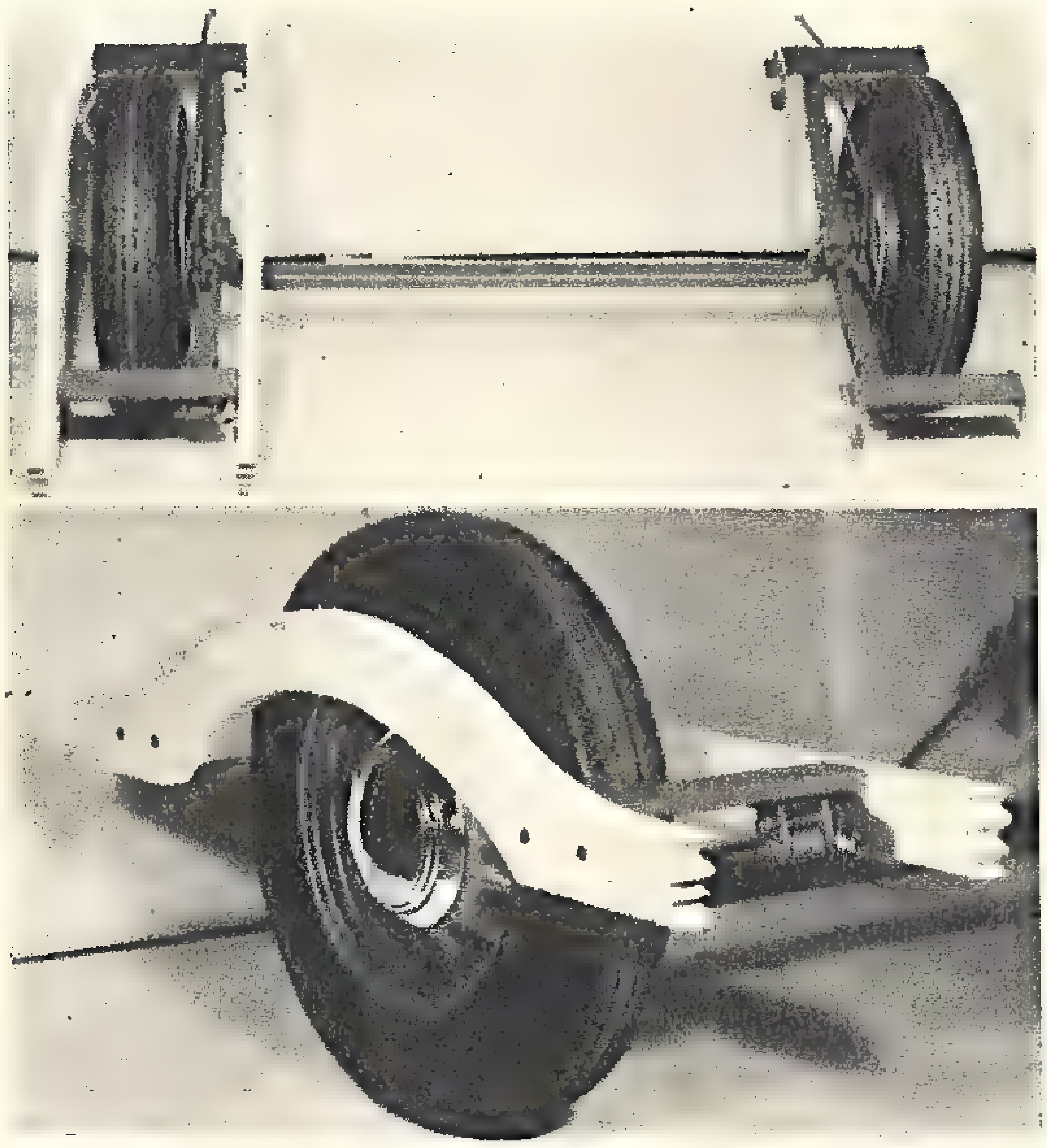
Completed after two years work by Frank Exner, famous physicist, the X-ray unit will be used for research work and treatment of cancer patients. Five patients can be treated simultaneously.

The tubes in the new machine are made of steel instead of glass. High voltage generating units contained within the tubes are grounded to prevent danger of shocking patients.



Five cancer patients can be treated simultaneously by this X-ray machine installed at Medical Center in N. Y. City. Developed by Frank Exner, physicist, the machine produces radiations equal to that of 100-million dollars worth of radium.

Axle Eliminates Strains



Easily attached to a steel or wooden trailer chassis, a new drop axle (upper photo) eliminates strain of torque, cranking and whipping. Lower photo shows method of attachment.

READILY adaptable to a steel or wood trailer chassis, a new drop axle designed to eliminate the strains of torque, cranking, and whipping has been developed by a Wausau, Wis., tool manufacturer.

The axle acts simply as a spacing bar between the wheels and carries little of the weight of the trailer, a Hotchkiss drive through the spring and spring saddle serving to relieve the axle of the usual strains incurred while the trailer is in motion.

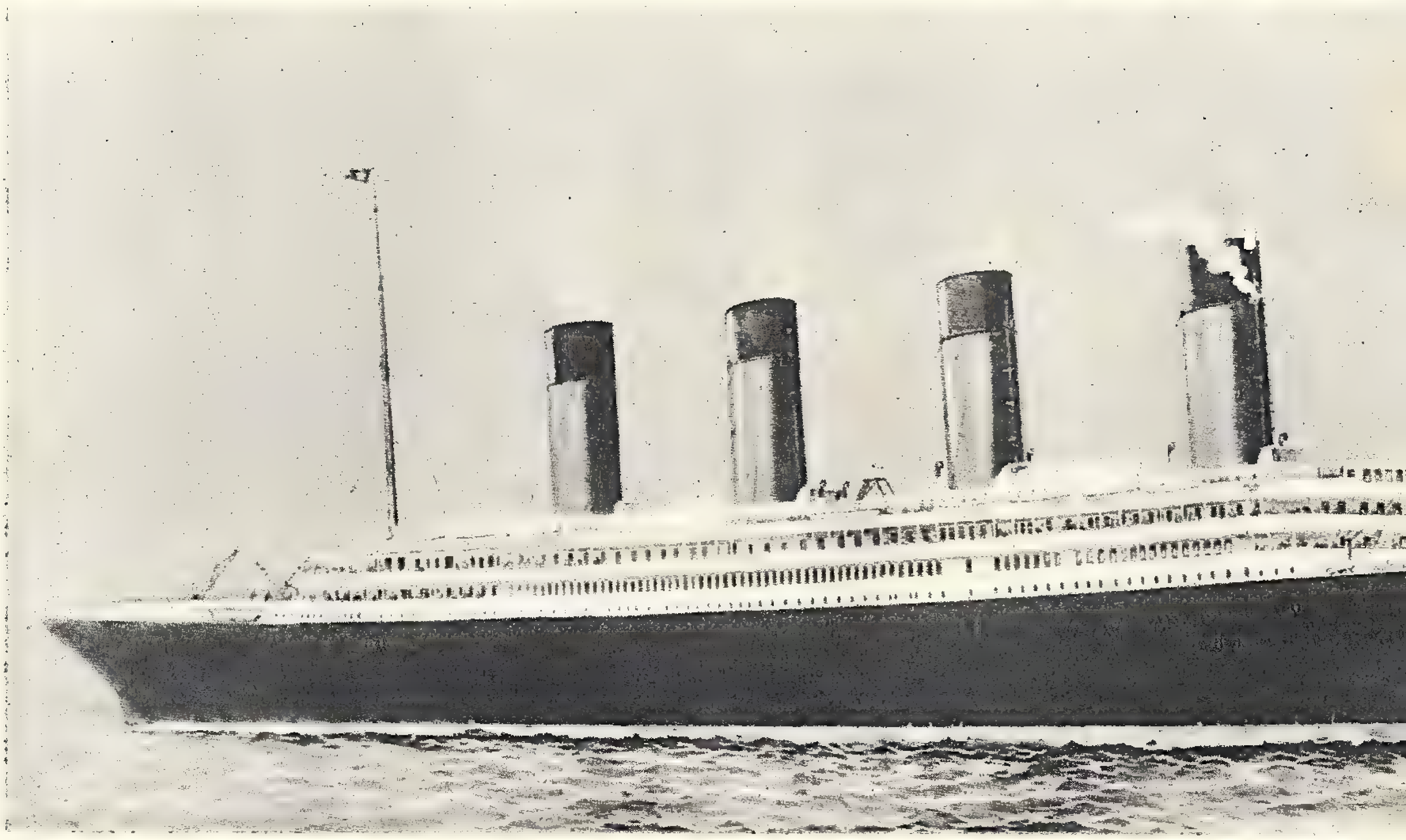
Sign Spells Its Message

AN ELECTRIC sign that spells its message leisurely or rapidly, by letters or groups, and at any desired rate of speed to obtain required emphasis has been developed by a Trenton, N. J., manufacturer. The sign consists of as many individual electric boxes as there are letters in the message to be flashed.

The boxes are simply pushed together by means of plugs, becoming electrically and mechanically connected to form a solid row. An electric bulb in each box is turned on by a self-contained timing device which is adjustable to any desired time lag. A shorting switch in each box eliminates the timing device if several boxes are to be flashed as a group. Boxes are available in several colors.

Featuring self-contained timing mechanisms, these electric sign letters can be regulated to flash slowly or rapidly, in unison or individually. Plugs form contact-connection.

"IFS" of the GREAT



Greatest ship of her day, the *Titanic* sailed westward 25 years ago this spring into circumstances rivaling Greek tragedy in catastrophic portent. A vessel of 46,328 tons and 882 feet in length she would be one of the biggest ships even today. There were accommodations aboard for 2,650 passengers and a crew of 892.

by Karl Baarslag

Author of "SOS to the Rescue"

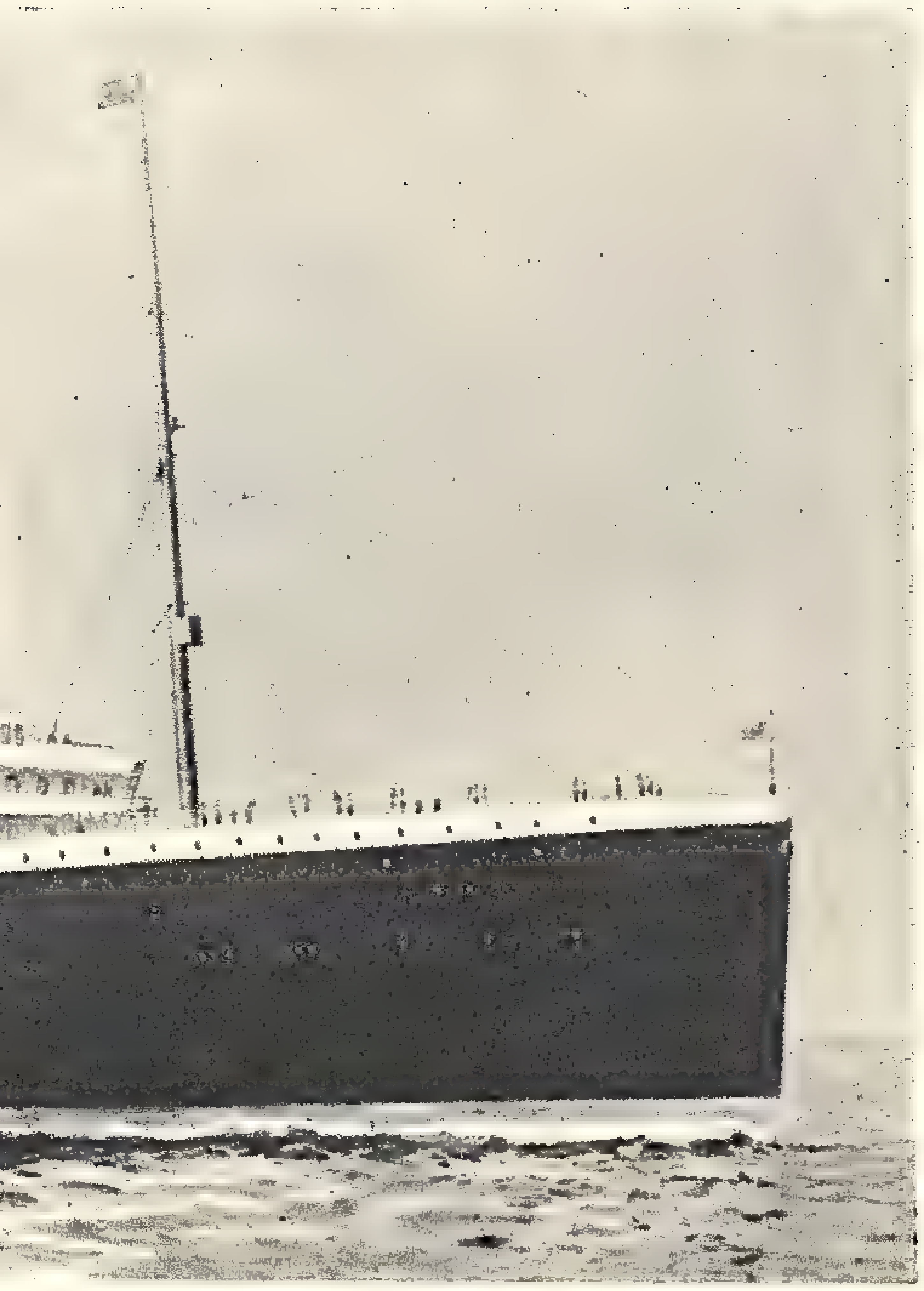
ALTHOUGH 25 years have passed, bringing with them many other sea disasters, the foundering of the White Star liner *Titanic* remains to this day the worst marine catastrophe of all time, measured in lives lost. On a spring night, April 15, 1912, 1,517 men, women and children perished in the icy waters over the Grand Banks of the North Atlantic. The material loss was more than $12,000,000. The world's newest, largest and most luxurious "unsinkable" ship went down on her maiden passage in two hours and forty minutes. Lost with her, on board and overboard, were a long list of prominent figures in the arts, in public life and in the business world. Her commander, E. J. Smith, Commodore of the line, went down with his ship, as did 77 per cent of her crew.

The world was stunned following the news. Business virtually ceased on the New York Stock Exchange. Consternation ruled at Lloyd's, who had insured the vessel at one of the lowest rates ever given because of her supposed "unsinkability." Buildings in London, New York, and elsewhere half-staffed their flags. The sinking aroused sensational rumors, wild charges, and acrimonious controversy. It was made the subject of two inquiries, first by the United States Senate, the other by the British Board of Trade, under presidency of Lord Mersey.

The poignancy of the *Titanic* disaster lies in the extraordinary tragic concatenation of circumstances, which, taken separately, would not have resulted in disaster but which, linked together in relentless succession, made the catastrophe inevitable. In no Greek tragedy can one find such an inexorable and fatal chain of calamitous circumstances. Here was no *General Slocum* fire and a panic of helpless women and children; no sudden sinking of a torpedoed *Lusitania* or badly holed *Empress of Ireland;* no helpless and leaking *Vestris* foundering after a severe storm. Just the glancing scratch of an iceberg—and a small berg at that!—on a starlit, calm, clear night.

After the two inquiries, the full tragic chain of "ifs" and "might-have-beens" stood re-

"TITANIC" TRAGEDY



From 25 years of study, a radio operator analyzes chain of events which swept an "unsinkable" ship to doom amid ice of North Atlantic.

vealed in terrible clearness. If the lookout men had sighted the berg a few seconds earlier the collision would have been averted entirely. Had the berg been sighted a few seconds later, the crash would have occurred more nearly head-on with probably a small loss of life, but with no danger of sinking. The ill-fated liner turned from her course just exactly far enough to receive a glancing, 300-foot long slash, on her starboard side immediately below the waterline.

If the *Titanic* had been built with an inner skin such as the *Mauretania* or other ships had, or, as is the usual practice, with wing bunkers along the side, the wound might have not been fatal. Even with no inner skin and with boiler rooms right across the ship, she could have floated if her bulkhead deck had been watertight, or, as Lord Mersey concluded, "If the transverse bulkhead abaft of No. 4 boiler room had been carried up to D deck, the ship would have remained afloat." Subsequent disclosures proved that this was the *Titanic's* Achilles heel. All the other watertight bulkheads were carried up one deck higher but for some inexplicable reason this bulkhead stopped at E deck. But, even with the forward bulkheads carrying a very low margin of safety, that is, up to E deck or only 11 feet above the water line in smooth water, she still sank slowly enough to permit all her passengers and crew to leave in ample time—if, and this is an incredibly tragic "if"—if there had been enough boats and rafts for those she carried.

Certified to carry 3,547 persons, she had boats for only 1,178, and even this meagre figure was nearly double that required by the antiquated Board of Trade law of 1894, which had not been revised in 18 years. Therein lay the ironic tragedy of the *Titanic*. Perfect weather and ample time for launching boats, such as few sinking ships have ever been

John George Phillips, chief radio operator of the *Titanic*, went down with his ship and the principal credit for the saving of the 712 persons rescued. There are monuments to him in both England and the United States.

The *Carpathia*, above, sped 58 miles through the icy night to pick up the boats of the *Titanic*. Howard Cottam, sole *Carpathia* radio operator, heard the distress message just as he was unlacing his shoes in preparation for bed.

fortunate enough to have—but there were not enough boats.

There were two other "ifs" in this almost impossible tragedy, strangely fateful "ifs" and both concerned another vessel, and were therefore purely fortuitous, but contributed nevertheless to the magnitude of the disaster. One, the inaction of the master of the SS. *Californian*, and the other the terribly tragic story of the *Californian's* single radio operator. Had he remained on watch but 15 minutes longer, he would have heard the *Titanic's* first SOS; she was less than 15 miles away, and everyone might easily have been saved.

Cyril Furmstone Evans, the *Californian's* lone operator, had been on watch since 7 a. m. and even a $20-a-month radio man is entitled to some rest. No reproach whatsoever attaches to him, but the tragedy, with its appalling loss of life, exposed to the public the wretched penuriousness of some steamship companies, so justly and forcibly condemned by Senator Smith, Lord Mersey, Marconi, the newspapers, and many others. New and stringent legislation was universally demanded, but, as Admiral Mahan so aptly stated, "Corporate responsibility is notoriously fugacious and elusive." The same spirit of misplaced economy today finds its loopholes through which to evade adequate radio protection.

The *Titanic*, the world's largest and newest deluxe passenger liner, was launched at Belfast, May 11, 1911. She completed her trial trip April 1, 1912, and two days later arrived at Southampton. Many prominent Americans deferred their departure from Europe so as to be able to sail on the new ship. The ill-starred liner sailed for New York on Wednesday, April 10, stopping at Cherbourg and Queenstown. She would dock at New York the following Tuesday or Wednesday. Her New York pier was gaily decorated.

With her 46,328 tons and 882 feet length, she would have been even today among the world's largest liners. Officers and crew numbered 892 and she had sumptuous accommodations for 2,650 passengers. However, she sailed with only 1,316. As Joseph Conrad satirically pointed out, she had every "banal hotel luxury," a French restaurant, Turkish and electric baths, swimming pool, veranda cafe, palm court, squash racket court and numerous other luxuries, but boat accommodations for only 53 per cent of the people on board.

The *Titanic* was the "last word" in naval architecture. Designed by Lord Pirrie and built by England's best known and oldest shipbuilders, Harland and Wolff, she embodied all the latest developments as to strength, safety, and modernity. Fifteen transverse bulkheads, their watertight doors electrically controlled, divided her into 16 watertight compartments, so proportioned that any two of the largest could be flooded without affecting her floating power. Keel, keelson, longitudinals, inner and outer bottoms were of a size, weight and thickness exceeding those of any other ship ever built. An elaborate system of pumps and piping could discharge an enormous influx of water. Her master was E. J. Smith, with 38 years of service, unmarred by a single serious accident. Except for a minor scraping, he had never been in an accident; had never seen one in fact. Such was their confidence in their new ship that the line offices in New York refused to believe her sunk for two days after the disaster. Questioning relatives were turned away with the assurance that it was "impossible" for her to sink.

The passage was uneventful and pleasant from the time Ireland was dropped astern to the fatal Sunday, April 14. On Saturday and throughout Sunday ice warnings began to come in by wireless. It was subsequently proved at the British inquiry that at least three of these were acknowledged with thanks by Captain Smith. Besides the radio warnings and the fact that at this time of the year ice could be expected in the region which they were approaching, a falling thermometer added a third ominous warning. It became intensely cold. The *Titanic,* in her pride, sped westward; westward to her doom at 21½ knots. At noon her run was posted at 526 miles. Even better was promised for the next day.

In the wireless cabin John George Phillips, the chief, and Harold Bride, the junior operator, were kept busy with their traffic. That Sunday the installation had broken down and Phillips had spent over six hours repairing a burned out and grounded transformer secondary. To his skill and persistence the 712 rescued probably owed their lives. Had he been unable to effect repairs, or had he deferred doing so, the disaster might have been much greater.

At 9:00 a. m., Sunday, the *Caronia* sent an ice message to the *Titanic* which Smith acknowledged 40 minutes later. It placed ice within five miles of the *Titanic's* course. Later that morning the *Baltic* also sent a message placing ice ahead of the new liner and wishing Smith and his ship "all success." This too was acknowledged. During the day the *Titanic* relayed to Washington an ice message from the German SS *Amerika* and later that evening the *Mesaba* informed the *Titanic* of the danger of ice ahead. From these and other warnings the *Titanic's* navigators plotted a rectangular field of ice some 70 miles long and 12 miles wide lying broad across their course. Still the great liner raced on at ever increasing speed—22, 23, 24½ knots per hour. The picture of the *Titanic,* ablaze with light, thronged by happy passengers, racing along through the night to her doom in the last few hours of her life, will remain forever one of the most gripping and dramatic memories of the sea.

The maintaining of course and speed in the face of numerous ice warnings became the crux around which both investigations centered. At the British inquiry, a number of veteran North Atlantic shipmasters, all ice experienced, unanimously swore that it had been their invariable and universal practice to maintain course and speed as long as the visibility was good. Schedules must be maintained and passengers are always in a hurry to reach land. One cannot go slow, or change course, merely because there is ice some-

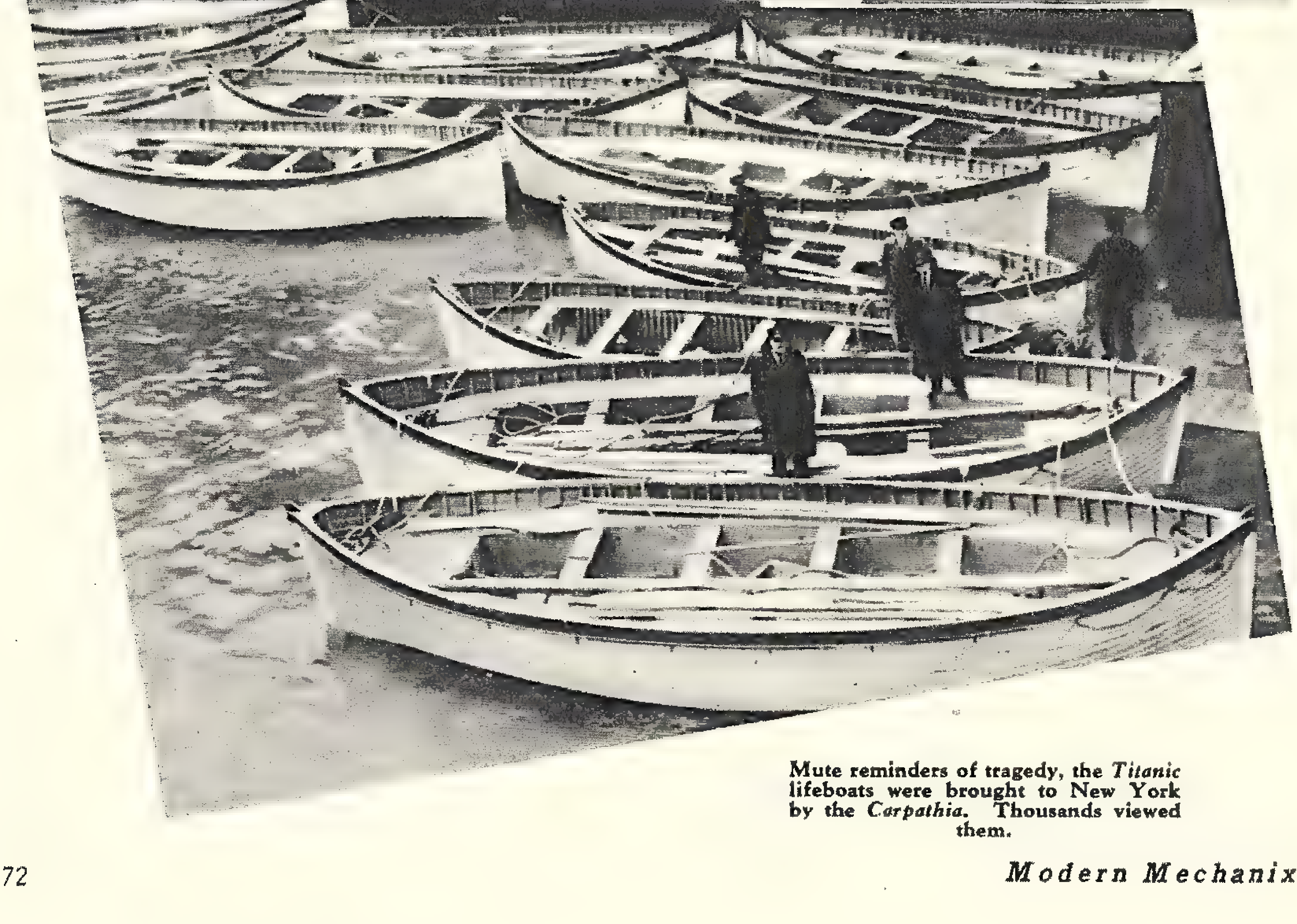
Capt. Arthur Rostron of the *Carpathia.* His preparations for the *Titanic* survivors were described as a miracle of foresight. He later commanded the *Mauretania* and the *Berengaria* and was accorded countless honors.

where ahead. Lord Mersey summed up the situation by saying, "Smith made a mistake, a very grievous mistake, but one in which, in the face of practice and of past experience, negligence cannot be said to have any part; and in the absence of negligence, it is, in my opinion, impossible to fix Captain Smith with blame." He added "the hope that the last had been heard of this practice and that for the future it would be abandoned. What was a mistake in the case of the *Titanic,* would without doubt be negligence in any similar case in the future."

The *Titanic* in her pride raced to her rendezvous with the pale death born of Greenland's glaciers. Between 6:30 and 9:00 that evening, the temperature dropped noticeably —from 43 to 32 degrees. The navigators very calmly figured "they would be up to the ice by 11:00 p. m." It does not appear to have been a matter of great concern to anyone. Captain Smith came on the bridge briefly about 9:00 p. m. and discussed with the officer on watch the weather—then "a flat calm"—and also the ice warnings. He left instructions to call him immediately if it became "at all doubtful," referring to the visibility. It was a wonderful night, unusually clear, starlit, and fine.

At 10:21 p. m. ship's time, the Leyland liner, *Californian* was stopped by field ice not over 20 miles from where the *Titanic* later went down. Evans, the radio operator, tried to inform Phillips of the fact about 11:00 p. m. but Phillips was busy "copying" messages from Cape Race, and Evans, being so much nearer and having a broad spark note, naturally interfered. Evans received a curt,

Harold Bride, junior operator on the *Titanic,* who was relieving Phillips as the first distress message was sent. He survived the tragedy on a raft but suffered frozen feet.



Mute reminders of tragedy, the *Titanic* lifeboats were brought to New York by the *Carpathia.* Thousands viewed them.

Among the radio operators who copied the *Titanic* SOS 25 years ago was young David Sarnoff atop the Wanamaker Building in New York. He is now president of the Radio Corporation of America.

"Shut up, I am busy with Cape Race," from Phillips. Phillips informed Cape Race that he had just been "jammed" by the *Californian* and to resume traffic after the last message which he had received "ok." Evans continued to listen for a few minutes to the stream of messages passing from Cape Race to the big liner; it was nearly midnight, and he had been on watch since seven that morning, 16 hours; his ship was stopped by ice; there was nothing else for him to do and no reason why he should stay up any longer.

Entirely oblivious of the portentous possibilities of his quite natural action, Evans took off his phones, switched off his receiver, and went to bed. Had he kept them on 10 or 15 minutes longer, he would have heard signals far more arresting than the dull exchange of routine traffic from coast station to ship, the dread CQD and SOS of a ship in distress, and, with his ship, he would have shared in the enviable distinction of saving 2,200 lives and preventing the world's greatest marine catastrophe.

Surely the Fates were more than unkind to 20-year-old Cyril Furmstone Evans. It is easy to be wise after the event. No blame or reproach attaches to Evans. Every other operator, the writer included, would probably have done the same. Even radio operators must sleep. By law, deck and engineer officers stand only four-hour watches, with eight hours of rest and a fresh man to relieve them at the expiration of each four-hour watch. Even the LaFollette eight-hour day for sea workers entirely overlooked the radioman. The lone operator when he closes down his receiver after a long day at the set never knows what may happen during his few hours of sleep; a ship may sink with loss of life within a few miles of him crying in vain for help into his unhearing apparatus.

At 11:40 p. m. Fleet, one of the two lookout men of the *Titanic*, saw a dark object dead ahead and not far off. He struck three bells from his crow's nest perch, the warning signal of something ahead, and immediately phoned, "Iceberg right ahead!" Chief Officer Murdoch ordered the helm "hard-a-starboard" and reversed the engines. He also closed the watertight doors by throwing the necessary electric switches. As the ship's head swung about two points to port, a slight scraping impact was felt. Captain Smith rushed on the bridge from his room and asked:

"What was that?"

"An iceberg, sir!" replied Murdoch.

"Close the watertight doors!" was Smith's order.

"Already closed, sir," was the reply.

Only 37 seconds elapsed from the time of sighting the berg to the instant of collision. The shock was so slight that passengers who were still up hardly noticed it. Four men playing cards got up when the ship stopped, went on deck, saw nothing, and returned to their game.

Others wondered vaguely why the great ship had stopped. Unknown to those on board, the *Titanic* had been slashed on her starboard side like a ripe melon. In less than 10 seconds her plating had been ripped open for a distance of 300 feet under water and about 10 feet above the turn of the bilge, from her forepeak to the No. 5 boiler room. Water poured into the five forward compartments to a height of 14 feet in the first 10 minutes.

Part of the crew of the *Carpathia*. These men turned over their quarters and their clothing and did everything possible to make the *Titanic* survivors comfortable on the crowded voyage to New York.

An officer testified later that he found the mail room, 24 feet above the waterline, awash 20 minutes after the collision. The flood exceeded the maximum capacity of the *Titanic's* system of powerful pumps. With only three of the four forward compartments flooded, the ship could have lived, but the flooding of No. 6 boiler room sealed her doom . The bulkhead, referred to by Lord Mersey in his report, was the low bulkhead that went up only to E deck. Water poured over the top of it into No. 6, destroying the *Titanic's* last slim margin of floating power. As the great liner settled lower and lower by the head, compartment after compartment was filled in turn and her life correspondingly shortened.

Bride, the junior radio operator, was asleep and did not feel the shock of collision. He awoke a few minutes later, probably because the throb of the engines had ceased, and got up to relieve Phillips at midnight instead of the usual 2:00 a. m. because he remembered that his chief had been up all day on the repair work and that "he seemed tired." Bride took over the phones and Phillips, who was preparing to retire, casually mentioned they must have struck something as the ship had stopped. Just at this moment Captain Smith came to the radio room and said:

"We have struck an iceberg and I am having an inspection made to tell what it has done to us. You'd better get ready to send out a call for assistance, but don't send it until I tell you."

He hurried back to the bridge. This was less than 10 minutes after the ship had stopped. Smith, despite the size of his ship and his confidence in her, was not unmindful of the value of radio and not hesitant to call for help.

Bride said that he and Phillips looked at each other in amazement; so incredulous were they, and such, too, was their faith in the "unsinkable ship" that they laughed and joked about it for some time. Bride relates, "We said all sorts of funny things to each other."

In less than 10 minutes Captain Smith was back in the doorway of the radio room. There was some sound of confusion coming from below, but no excitement in his voice or manner; however, he looked grave.

"Send out the call for assistance!" he ordered.

"Which call, Captain?" Phillips asked.

"The regular international call for help," was his reply; he hurried away.

This time Phillips did not laugh; nor did he hesitate. On full power he rapped out CQD six times, followed by the *Titanic's* call letters, MGY.

The liner was equipped with a rotary type of spark gap, now long extinct. Its crackling, musical whine leaped across the Atlantic's cold and darkened waters. At Bride's suggestion, he varied his distress calls with the SOS, which, although adopted internationally in 1908, had not completely displaced the older CQD in the British operator's affections.

Captain Smith returned and joined them in laughing at Bride's quip that it might be Phillips' "last chance ever to send another SOS." Grim prophecy spoken in jest! At this time Captain Smith must have still felt supreme faith in the invulnerability of his new ship.

The German SS *Frankfort,* 153 miles to the southwestward, was the first to answer. Phillips gave him the *Titanic's* position and asked for assistance. While the *Frankfort's* operator took this to his captain, Howard Cottam, the operator of the SS *Carpathia,* asked Phillips, did he know that there was traffic for the *Titanic* at Cape Cod station? Cottam had not heard the distress call of MGY. He was startled to receive:

"Come quick, we have struck a berg! It's CQD, old man!"

That Cottam happened to be on watch was purely fortuitous. He remained at his post long after his time was up because he was interested in the English coal strike and wanted to hear Cape Cod's dispatches. Cape Cod also called the *Titanic,* and he thought that, in turn, he would inform the line of the fact. As sole operator, he too, would ordinarily have been in bed at this late hour.

Captain (now Sir) Arthur Rostron, in his recent memoirs, *Home from the Sea,* says that Cottam was ready to switch off his receiver, and had in fact already started to unlace his shoes when the *Titanic's* distress call came in.

Cottam lost no time in informing Rostron, who had turned in but was not asleep. Rostron, too, was incredulous—the world's largest and newest liner, the "unsinkable" *Titanic,* in distress on her maiden voyage? Impossible! There must be a mistake. He sprang from his bunk and grabbed Cottam by the sleeve.

"Are you sure it is the *Titanic?"* he asked.

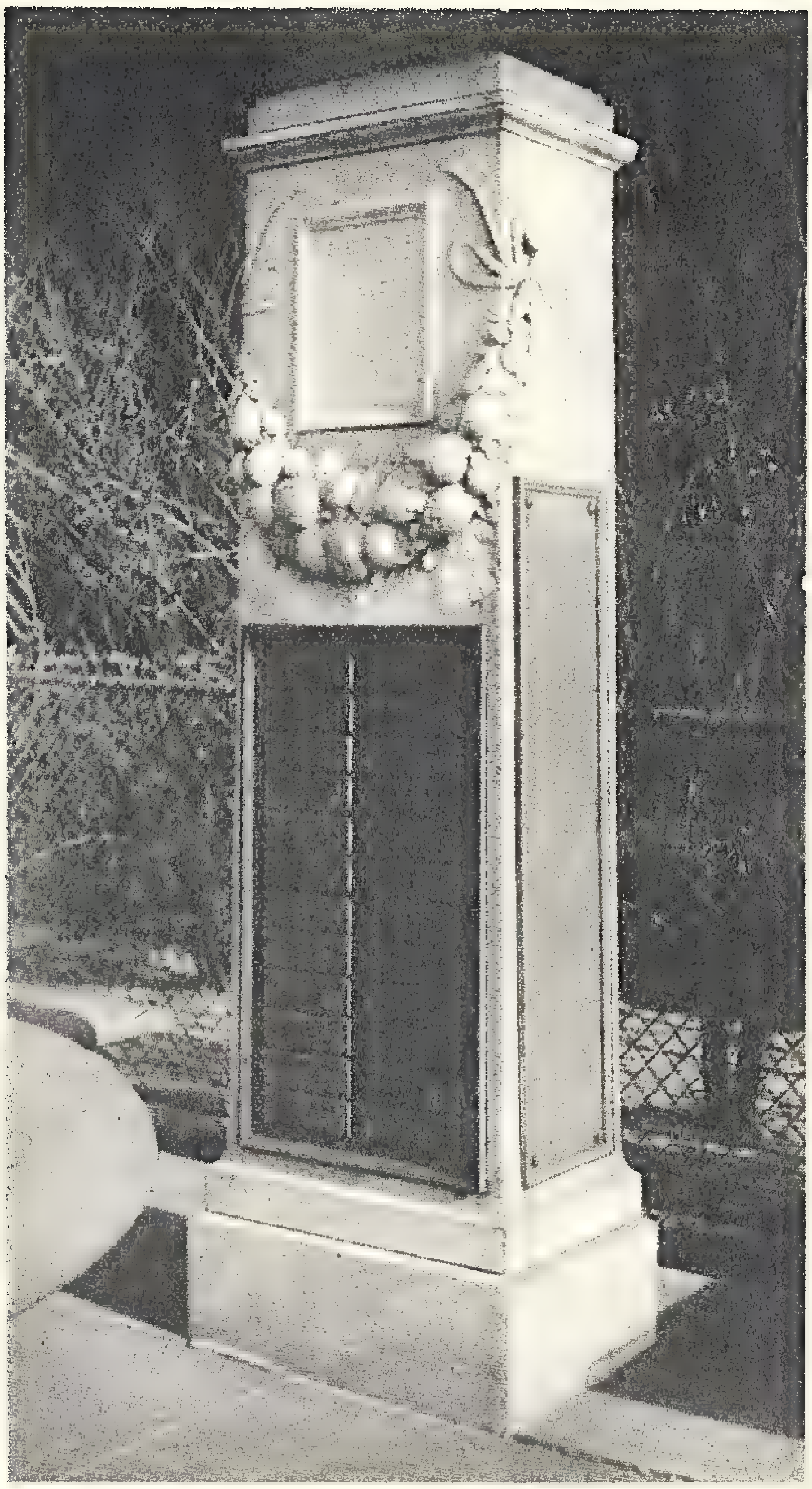
"Yes, sir." Still it seemed utterly impossible.

"Are you absolutely certain?" Rostron asked again. Cottam stood his ground; he was sure. The second affirmative convinced Rostron.

"All right, tell him we are coming along as fast as we can."

A quick comparison of positions disclosed that they were 58 miles apart. Rostron's famous "North 52 West!" was given to the helmsman and the *Carpathia* was off on her historic dash! Every officer and man was roused out and assigned to duty; stokers off watch tumbled out and, without dressing, rushed to the firerooms to augment the black gang on watch. Preparations for the most remote contingency were made, not the smallest detail was overlooked. Boats were swung out and made ready to lower, lights and ladders were rigged, life lines rove along the side, blankets, life-rings, hot coffee, restoratives, beds, doctors—all were ready. Bosun's chairs were rigged for children and the incapacitated.

Captain Rostron's preparations to receive an unknown number of survivors and possibly sufferers was praised by the United States Senate investigating committee as a "marvel" of foresight and masterly organization.



The name of John George (Jack) Phillips, chief operator on the *Titanic,* is the first name on this memorial to radio operators who died that others might live. The memorial is in the Battery Park of New York. Its inscription reads: "Erected in memory of wireless operators lost at sea at the post of duty."

Under forced draft, the *Carpathia* raised her normal 14 knots to well over 17. Engineers anxiously watched the steam gauges; they did not dare to let her have another ounce of steam. The old *Carpathia* trembled from the increased speed but most of the passengers slept on. To allay alarm, officers and stewards had been instructed that the passengers were not to be told of any change in course. There have been few more thrilling sea races than the *Carpathia's* dash through the night and ice.

Another ship turned to the rescue, the *Mount Temple*, some 50 miles to the westward. Her operator, J. Durrant, was also preparing to turn in when the stricken liner's SOS was received. The *Mount Temple's* best possible speed was 12 knots and at 3:00 a. m. she began to encounter ice and 25 minutes later she was stopped by the same field of ice which had stopped the *Californian* earlier in the night. The *Mount Temple* reached a position about 14 miles from the sinking *Titanic*. Durrant's conduct is an example to many present day operators who so often needlessly clutter up the air asking for details on the SOS, or telling others to keep quiet. "I never sent a word after getting his position," was his report.

Far and wide over the Atlantic, operators of many nationalities sat tense and silent in little wireless cabins, straining their ears to catch the soft whispers from the British liner. Crystal detectors, or similar non-amplifying types, still ruled in 1912 and signals were none too loud. A number of other ships turned to the rescue, drawn to a common center by the magnetic CQD and SOS. They questioned each other as to details or hurled the dread news still farther abroad to more distant listeners.

On the *Titanic*, Phillips' busy and last few hours of life were harassed by the shrill noise of escaping steam, as the engineers reduced pressure on their boilers to prevent an explosion. With no amplifiers, signals were faint and required quiet to insure accurate reception. Captain Smith got the engineers to reduce the noise somewhat. While he was calmly sending details to Cottam and collecting positions of nearby ships, Phillips turned to Bride and suggested that he had better dress. Bride, as yet, had forgotten to do so.

Captain Smith, a man of extraordinary calm and decisive action, made a number of trips to the radio room. He reported the engine room filling and, later on, came back and gave the ship another half hour of life. At first Bride acted as messenger, taking all messages to the bridge or wherever the captain was supervising the launching of the lifeboats. Later Phillips went out himself just to "see how things are progressing." It was his first time away from the key in many hours. He returned to the key looking serious. Women and children were being put off in the boats. He told Bride, "Things look queer!" He might well say "queer"; the forward deck of the liner was already under water. He resumed his sending and was soon in communication with the *Titanic's* sister ship, the *Olympic*, 500 miles to the eastward. The *Baltic* advised that she had turned to the rescue. The Russian SS *Birma*, 70 miles away, radioed that she, too, was on the way, all converging on the icy Grand Banks.

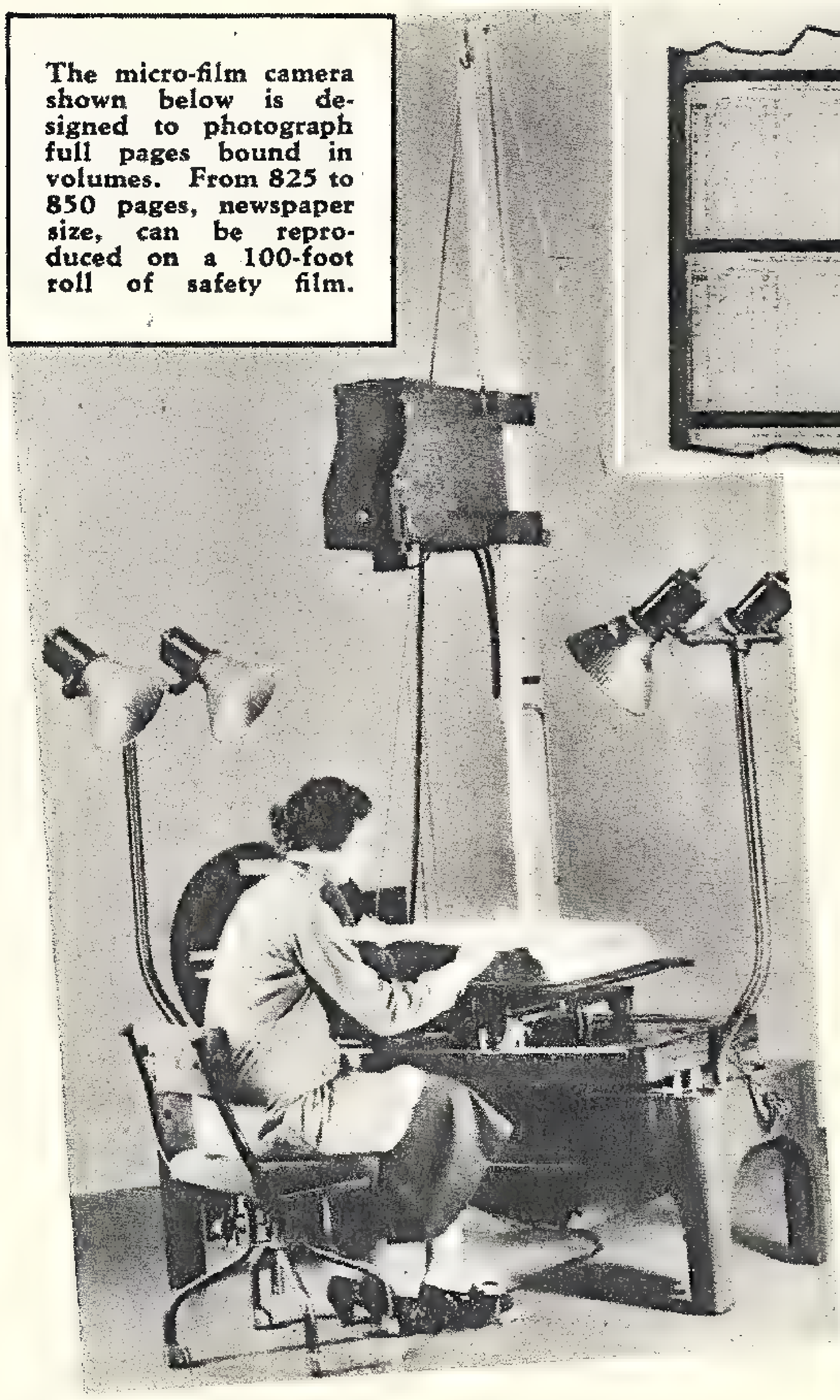
On the boat-deck, the work of lowering lifeboats began at 12:20 a. m., 40 minutes after the collision, and proceeded without

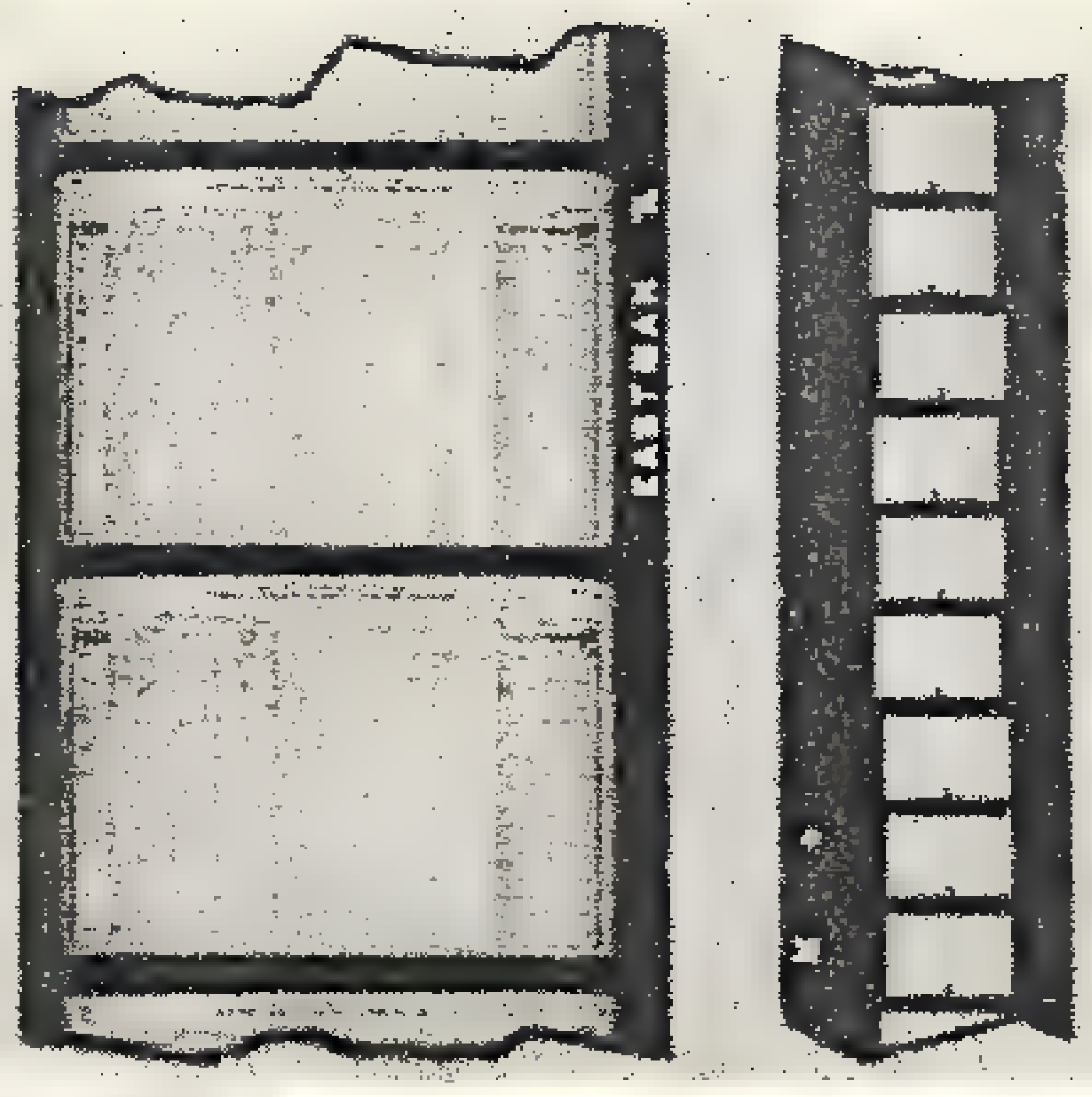
[*Continued on page* 118]

Women of America erected this memorial "To the brave men who perished in the wreck of the *Titanic*. They gave their lives that women and children might be saved." It stands in Washington's Potomac Park.

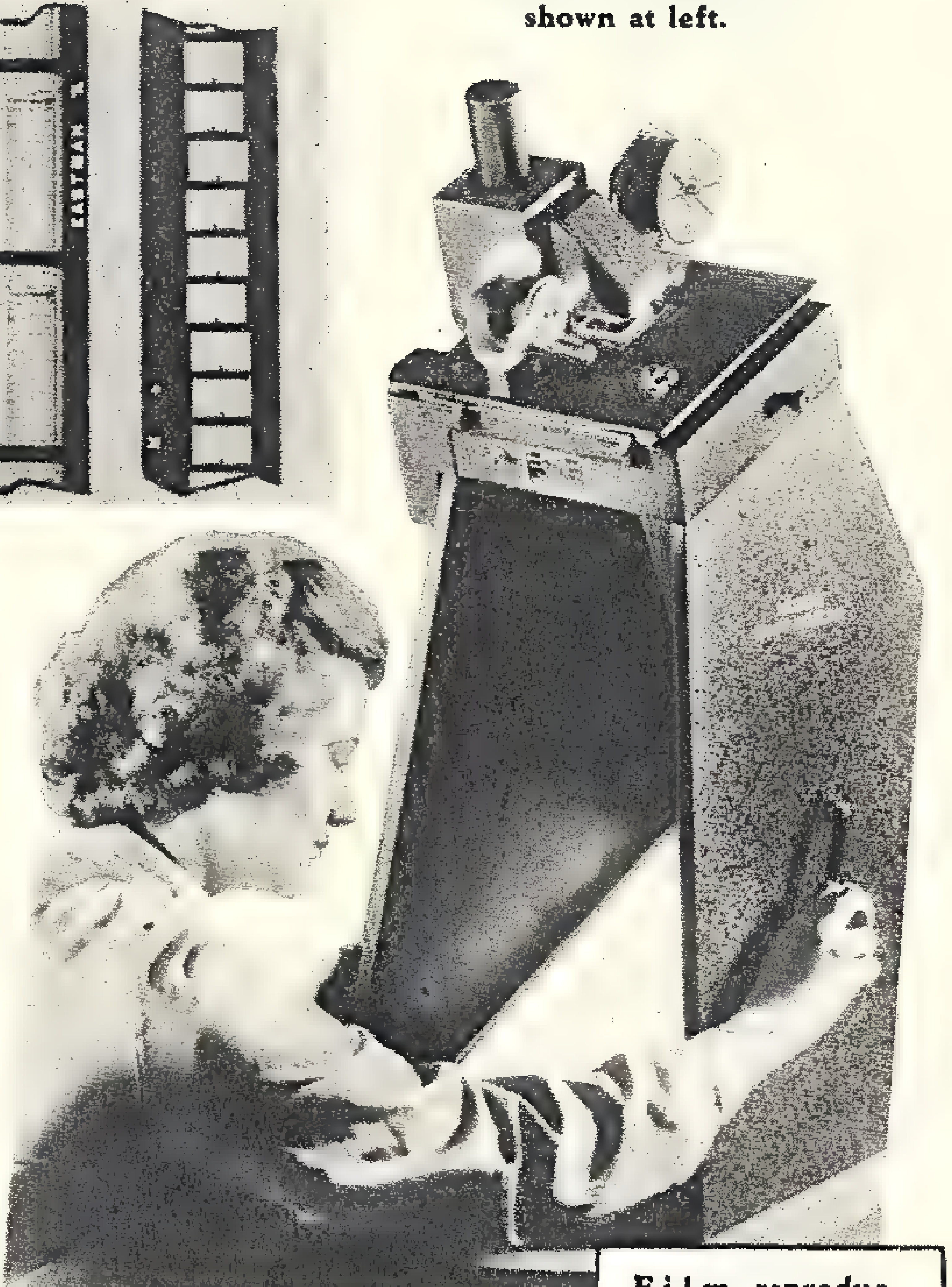
Giant Cameras Film Census Data

The micro-film camera shown below is designed to photograph full pages bound in volumes. From 825 to 850 pages, newspaper size, can be reproduced on a 100-foot roll of safety film.

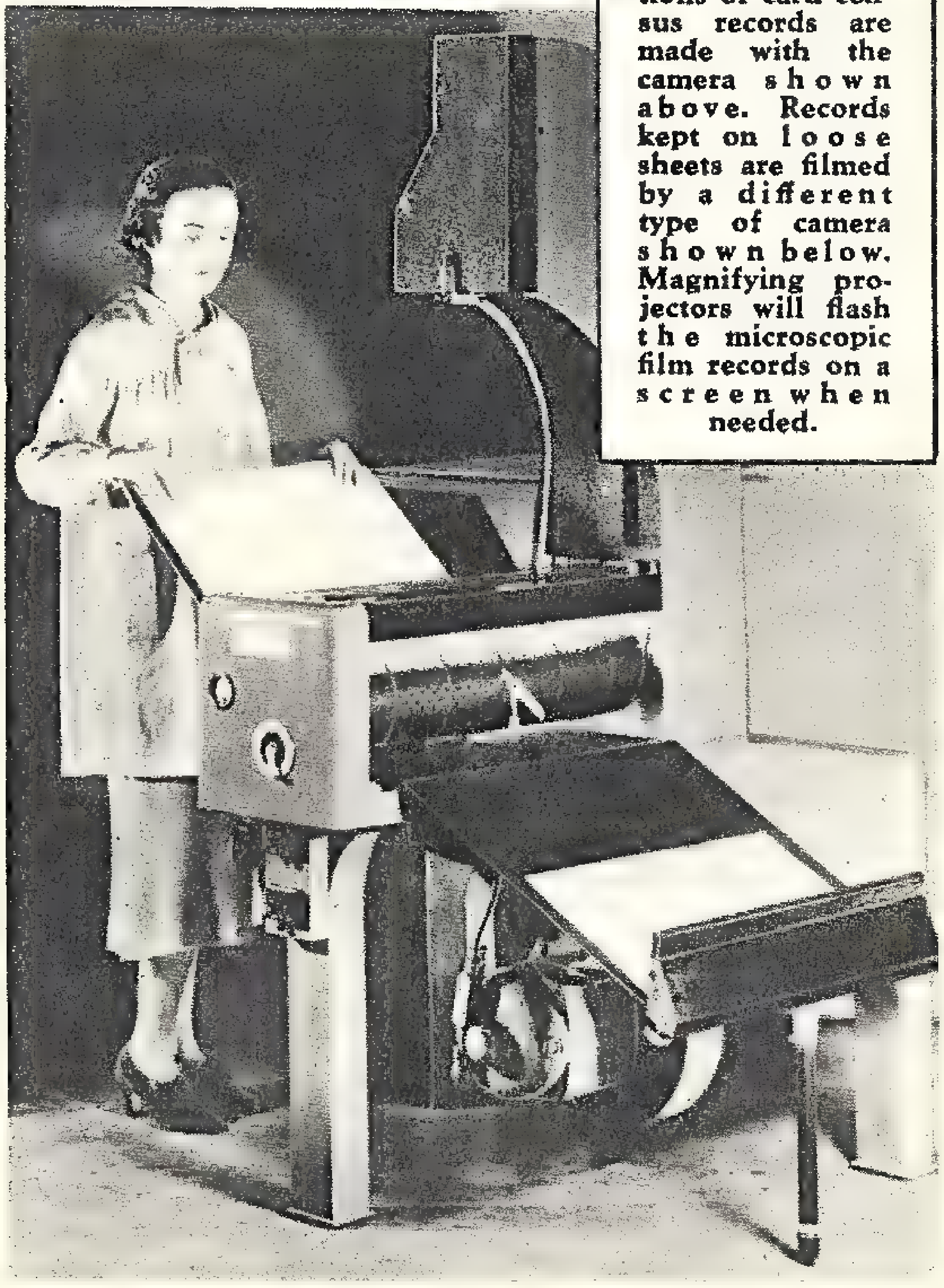




Reproductions of census records on 35 mm. and 16 mm. size films are shown at left.



Film reproductions of card census records are made with the camera shown above. Records kept on loose sheets are filmed by a different type of camera shown below. Magnifying projectors will flash the microscopic film records on a screen when needed.

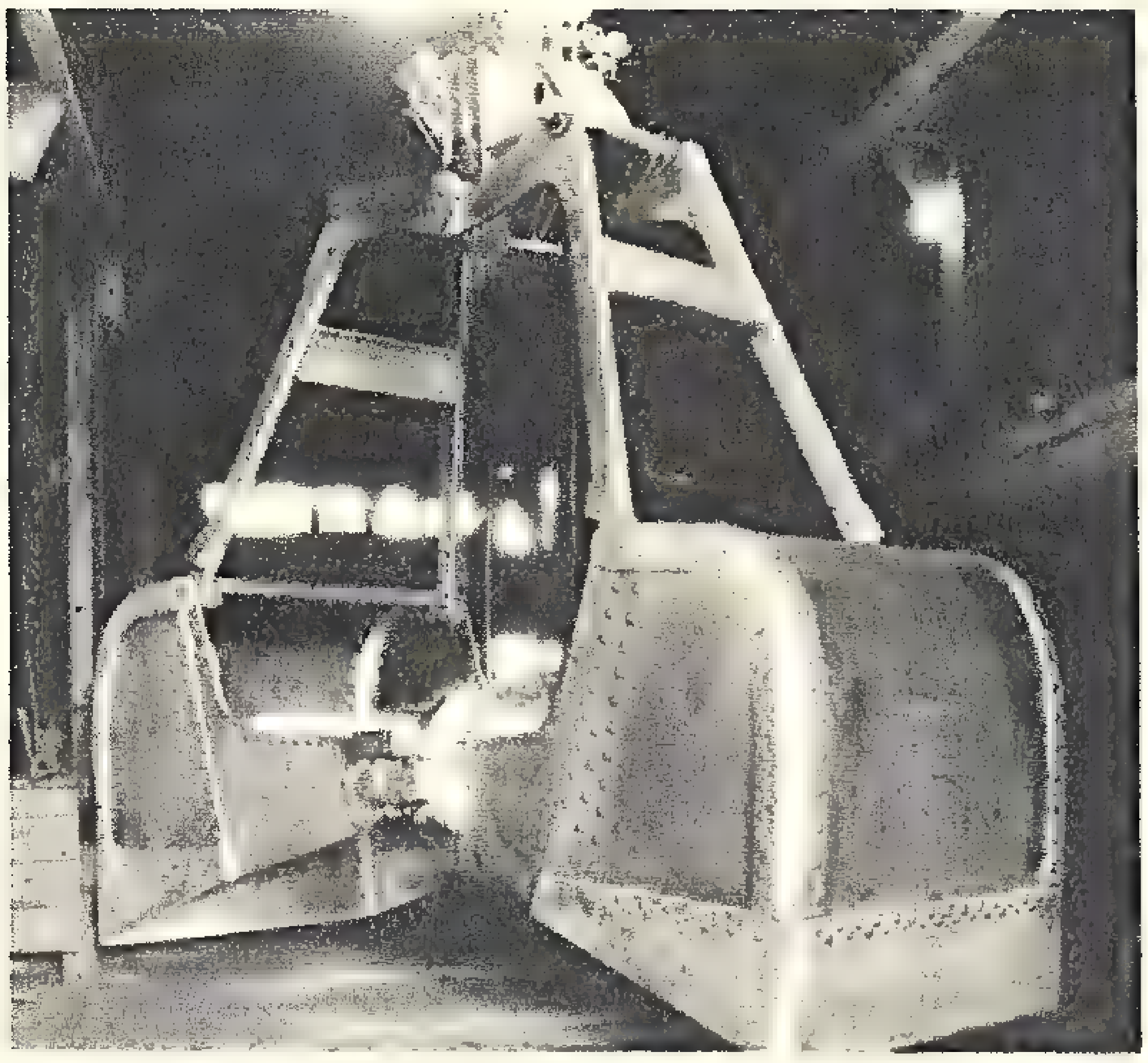


SPECIALLY designed giant cameras are being used by the Bureau of the Census to record on motion picture film, in microscopic size, the 126 million names and other data gained in the censuses of 1880 and 1900 which have been kept on cards and in 25-pound volumes occupying a mile of shelves. A 95% saving in storage space will be achieved and the data can be reproduced on a screen, when needed, through use of a magnifying projector.

The cameras are products of the Eastman Kodak Company, of Rochester, N. Y., and the films are both fire and waterproof, insuring maximum safety for the records. The nine million pages of reports will require only 28 standard size cases of films when photographed.

The census data contains facts of importance to many persons attempting to qualify for Social Security Act benefits.

Huge Bucket Scoops 12-Ton Load In Single Bite



Standing 18 feet high, this massive alloy steel bucket will take 12-ton bites of coal for the Pittsburgh Coal Co., of Pennsylvania for whom it was made by Hayward Co., of N. Y. C.

WEIGHING 23,000 pounds and featuring a jaw spread of 19 feet, a huge clam shell type coal bucket developed by the Hayward Co., of New York City, is capable of scooping up 12 tons of coal in a single bite. The bucket was built for the Pittsburgh Coal Co., of Pittsburgh, Pa.

The shells of the bucket are of one-piece alloy steel construction, devoid of rivets, and with streamlined cutting edges that make for easier digging.

A power wheel device built into the bucket causes both shells to dig with equal force and efficiency. A closing rope rotates the power wheel and lifts the bucket, the wheel transmitting the force to powerful link chains that serve to close the bucket shells.

Form Scrap Iron Briquettes

CREATING a new local industry, an enterprising metal firm in Milwaukee, Wis., collects scrap shavings and borings from machine shops and, through use of a huge press exerting 350 tons pressure, converts the scrap metal into briquettes. These are sold to foundries for remelting into castings.

The scrap material is hoisted by crane to a hopper above the giant press which then takes only one minute to turn out twelve briquettes weighing eight pounds each. Present production is 20 tons per day, but will be increased to 60 tons daily according to plant officials who endeavor to keep the supply ahead of the ever increasing demand.

Frank Petrovick, foundryman, examines eight-pound scrap metal briquettes used for making castings. Briquettes are formed under 350-ton pressure. (Milwaukee Journal Photo)

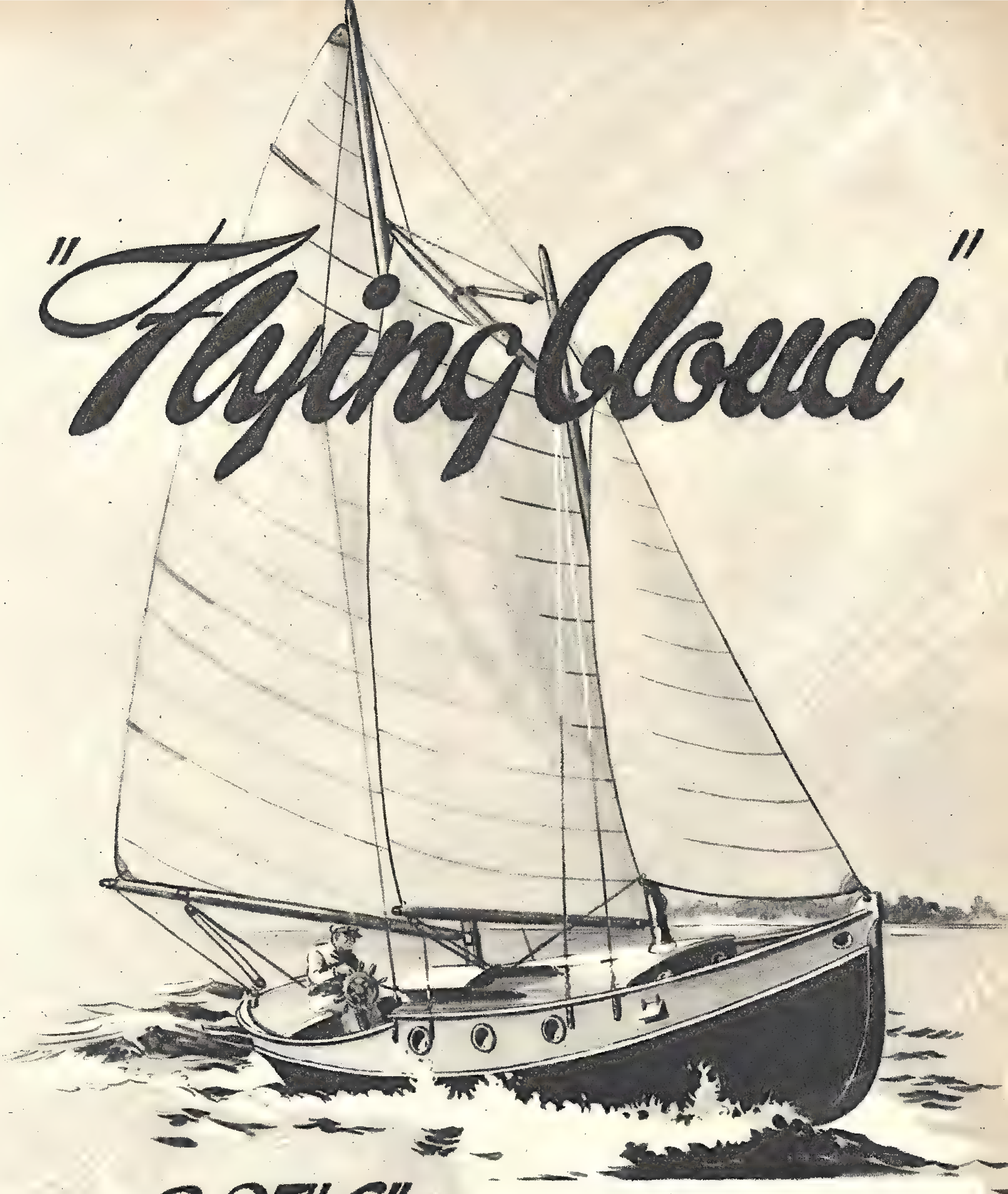
Tire Changer Aids Air Line

United Air Lines mechanic demonstrates device developed for quick and easy removal of tires from air liners. Jack and auto rim device loosens and forces tire from airplane wheel.

DEVELOPMENT of a new tire changing device by mechanics of United Air Lines at Seattle, Wash., has reduced the time required to change a big air liner's tires from an hour and a half to five minutes. Installation of the device is planned for the air line's stations from coast to coast.

The tire changer consists of a steel auto rim welded to two parallel pieces of 1½-inch angle iron. These irons support two pieces of 1-inch pipe on which is mounted a 1-ton hydraulic jack. Resistance for the jack is provided by two pieces of 2½-inch pipe bolted to a hangar girder. The tire is laid on the floor deflated and the auto rim placed over the inner edge of the tire. The jack is then used to apply a steady pressure to break the tire loose.

"Flying Cloud"



A 27'-6" Auxiliary Cruiser

LARGE enough for carrying a small family on a week-end sailing cruise on coastal or inland waters this craft provides the answer to numerous requests for a luxury craft within reach of all boat fans.

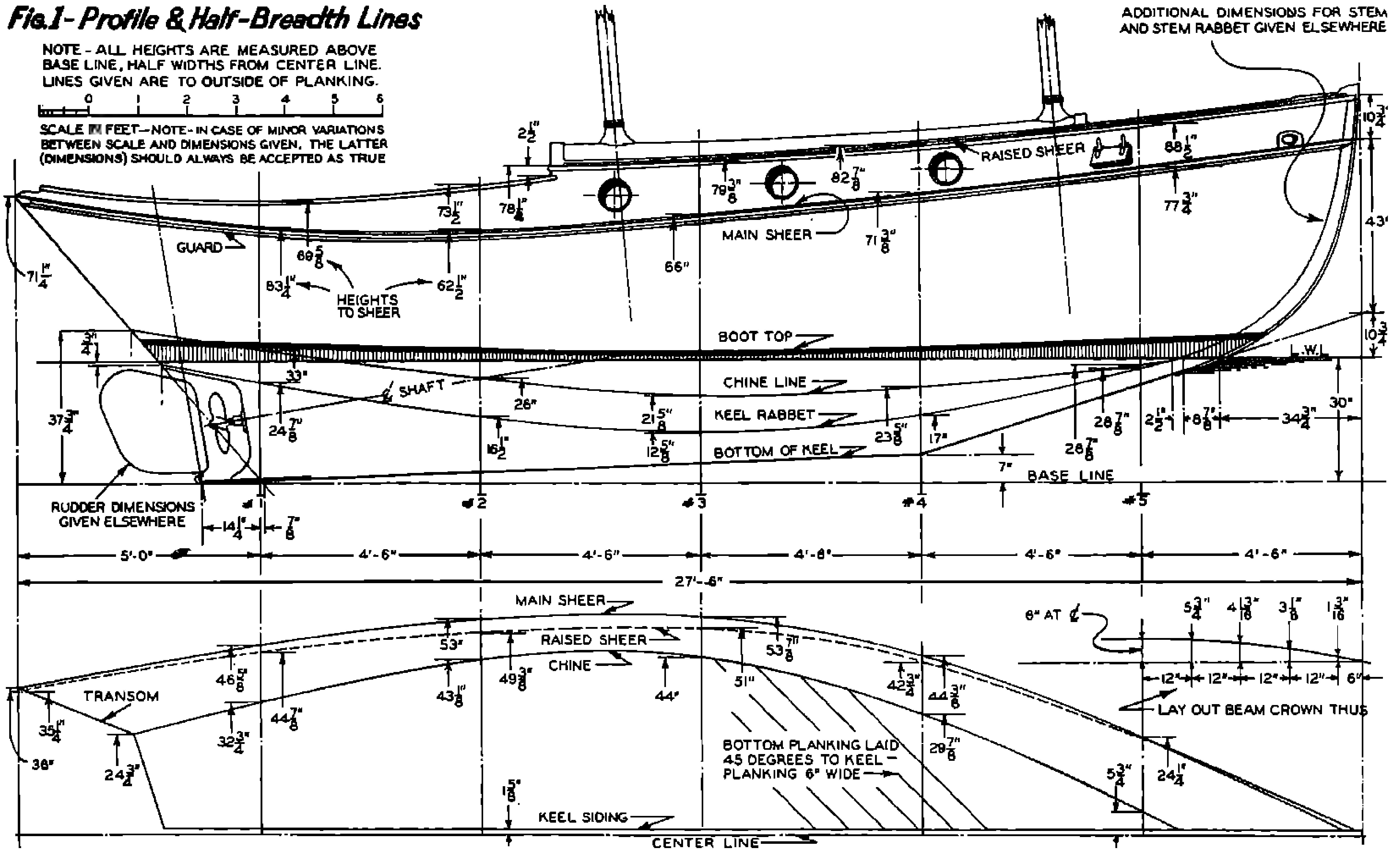


Fig.1 - Profile & Half-Breadth Lines
NOTE - ALL HEIGHTS ARE MEASURED ABOVE BASE LINE, HALF WIDTHS FROM CENTER LINE. LINES GIVEN ARE TO OUTSIDE OF PLANKING.
0 1 2 3 4 5 6
SCALE IN FEET—NOTE—IN CASE OF MINOR VARIATIONS BETWEEN SCALE AND DIMENSIONS GIVEN, THE LATTER (DIMENSIONS) SHOULD ALWAYS BE ACCEPTED AS TRUE
ADDITIONAL DIMENSIONS FOR STEM AND STEM RABBET GIVEN ELSEWHERE
GUARD
HEIGHTS TO SHEER
RAISED SHEER
MAIN SHEER
BOOT TOP
CHINE LINE
KEEL RABBET
BOTTOM OF KEEL
BASE LINE
L.W.L.
SHAFT
RUDDER DIMENSIONS GIVEN ELSEWHERE
#1
#2
#3
#4
#5
5'-0"
4'-6"
4'-6"
4'-6"
4'-6"
4'-6"
27'-6"
MAIN SHEER
RAISED SHEER
CHINE
TRANSOM
KEEL SIDING
CENTER LINE
BOTTOM PLANKING LAID 45 DEGREES TO KEEL — PLANKING 6" WIDE
6" AT ℄
LAY OUT BEAM CROWN THUS
12" 12" 12" 12" 6"

Here are given the profile and half-breadth lines for Flying Cloud. Make certain that you follow dimensions given.

"Flying Cloud"

Designed Especially For Modern Mechanix

by Sam Rabl

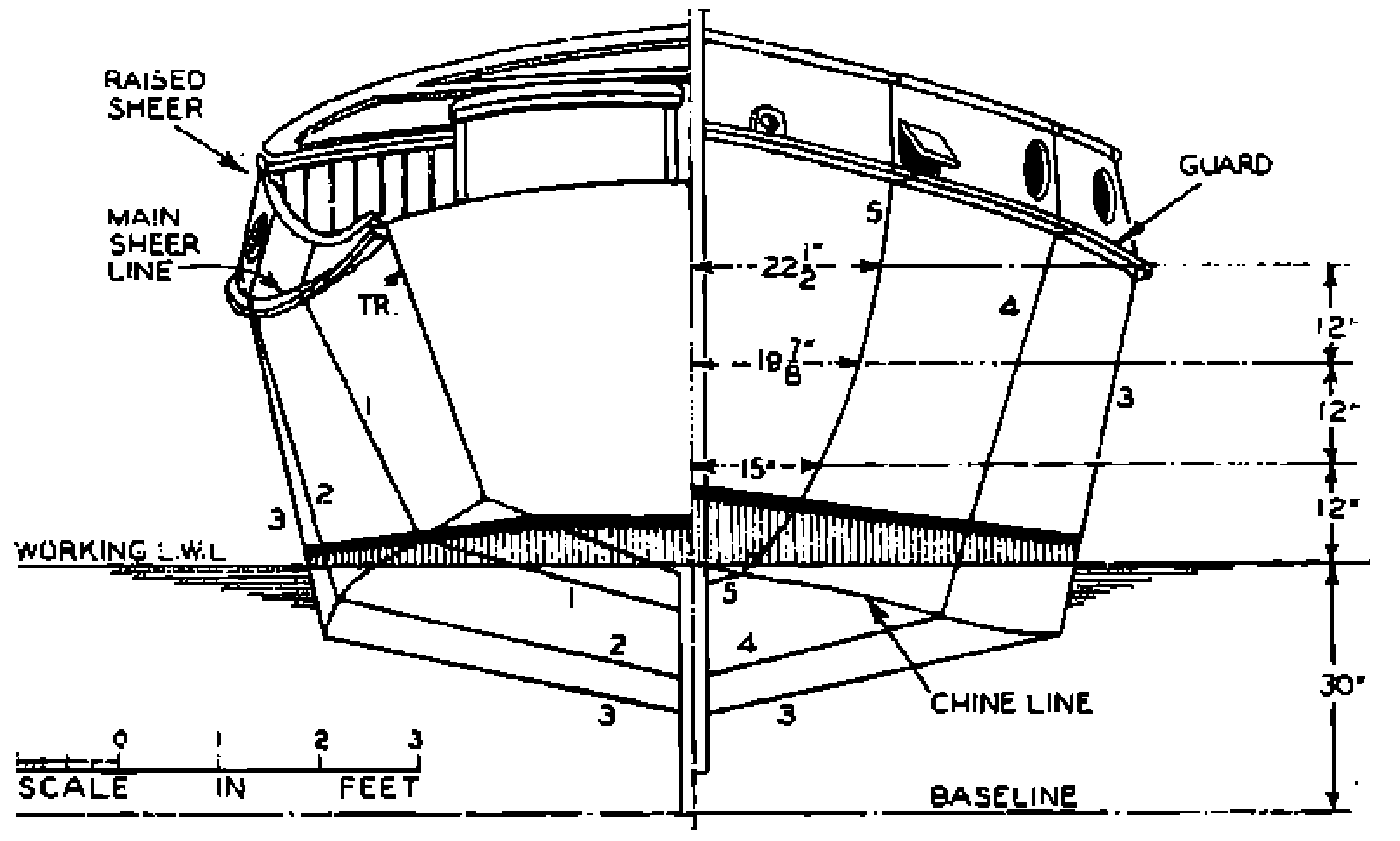
Naval Architect

PART I

HARDLY were the plans for *Buddy* off the press than MODERN MECHANIX boat fans everywhere began to demand a larger boat along the same general lines. The simple construction of this craft placed her within financial reach of every ambitious youngster who could wield a saw and push a plane. Many of the original craft were built with exceptionally fine results; one of them having crossed the Gulf of Mexico.

Men who earn their living today must be back at the office or shop Monday morning and, of course, require a boat that will not require hours to dock. Nevertheless, the craft must be large enough to provide comfortable accommodations for the average family and not cost too much to build. With all of these essential points in mind plans were drawn up for this "ideal" boat and eventually the boat itself was constructed and christened *"Flying Cloud"* after that famous old American vessel. Somehow we feel that the spirit of old Donald McKay, designer of the original sailer, will look down kindly upon our miniature version.

Flying Cloud may be built as cheaply as possible or it may be constructed of expensive materials. The power plant is either a converted auto motor or any inexpensive marine engine. The latter is preferred due to its efficient cooling system which does away with the problem of heat in the cabin. Toilet facilities have been provided and all other necessities of extended cruising have been incorporated into her make-up. The builder can either adopt the cabin plan which we have designed for *Flying Cloud* or fit one of his own to the existing interior. You may fit the sailing rig or leave it off depending on your own whims. As an out and out motor boat she still has pleasing lines and the draft may be made less than shown by taking three inches off the depth of the keel. While it will not be within the scope of this article to go into the detail of laying down the lines and fitting each and every piece of material in the structure we will refer the reader to our *How To Build Twenty Boats* for this information. Materials used in *Flying Cloud* construction may be any locally obtained wood suitable for boat building. *Buddys* were built from

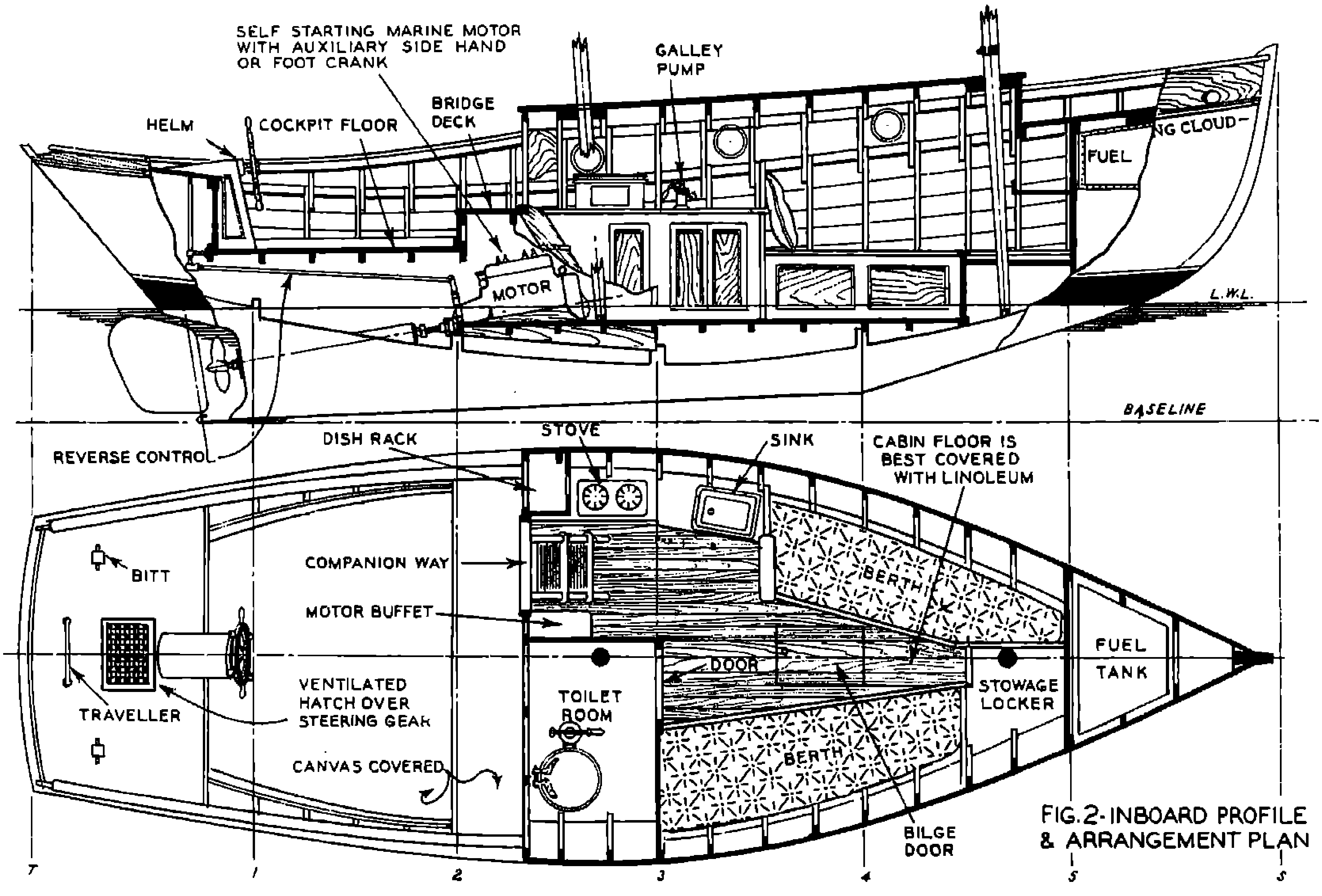


Body Plan

℄
RAISED SHEER
MAIN SHEER LINE
TR.
GUARD
22½"
19⅞"
15"
12"
12"
12"
30"
1
2
3
4
5
WORKING L.W.L.
CHINE LINE
0 1 2 3
SCALE IN FEET
BASELINE

as many different materials as are found around the world from New York to Singapore and all are a success. Good solid and well made joints contribute more to the success of any boat than the excellence of the material.

After the backbone is laid down on a large sheet of building paper the shape of the various parts are transferred to the wood either with a tracing wheel or by driving small brads through the outline, withdraw the paper, leaving the brads standing in the wood. The thickness of the stem and keel timbers are such that the ordinary small workshop bandsaw will handle them but the easier method is to take the timbers to a mill that has a large bandsaw and let them do the job. After the timbers are cut and ready to assemble they should be temporarily held together with clamps and a saw run between each joint until the surface is wood to wood. This process is repeated for each joint of the backbone and after all joints are thus fitted they should be smeared with "Staytite" or other similar cement, or a good roofing cement to exclude water and most of all the destructive toredo found along the seacoast. The joints are made with drift bolts of ½-inch galvanized iron headed up over clinch rings or galvanized iron washers. Holes for the drift bolts are drilled a sixteenth smaller than the bolt and the bolt slightly pointed to enter the hole. This pointing is done cold so as not to harm the galvanizing any more than possible, though bolts with nuts and washers may be used if the builder so prefers. After the backbone is assembled the apron of 2"x6" material is securely fastened to the top of the keel using cement as before to seal the joint. This member is left square until the planking is fitted. The backbone is now set up in its proper position on the ground or shop floor being sure to have the proper slope on the bottom of the keel and the stem perfectly plumb athwartship.

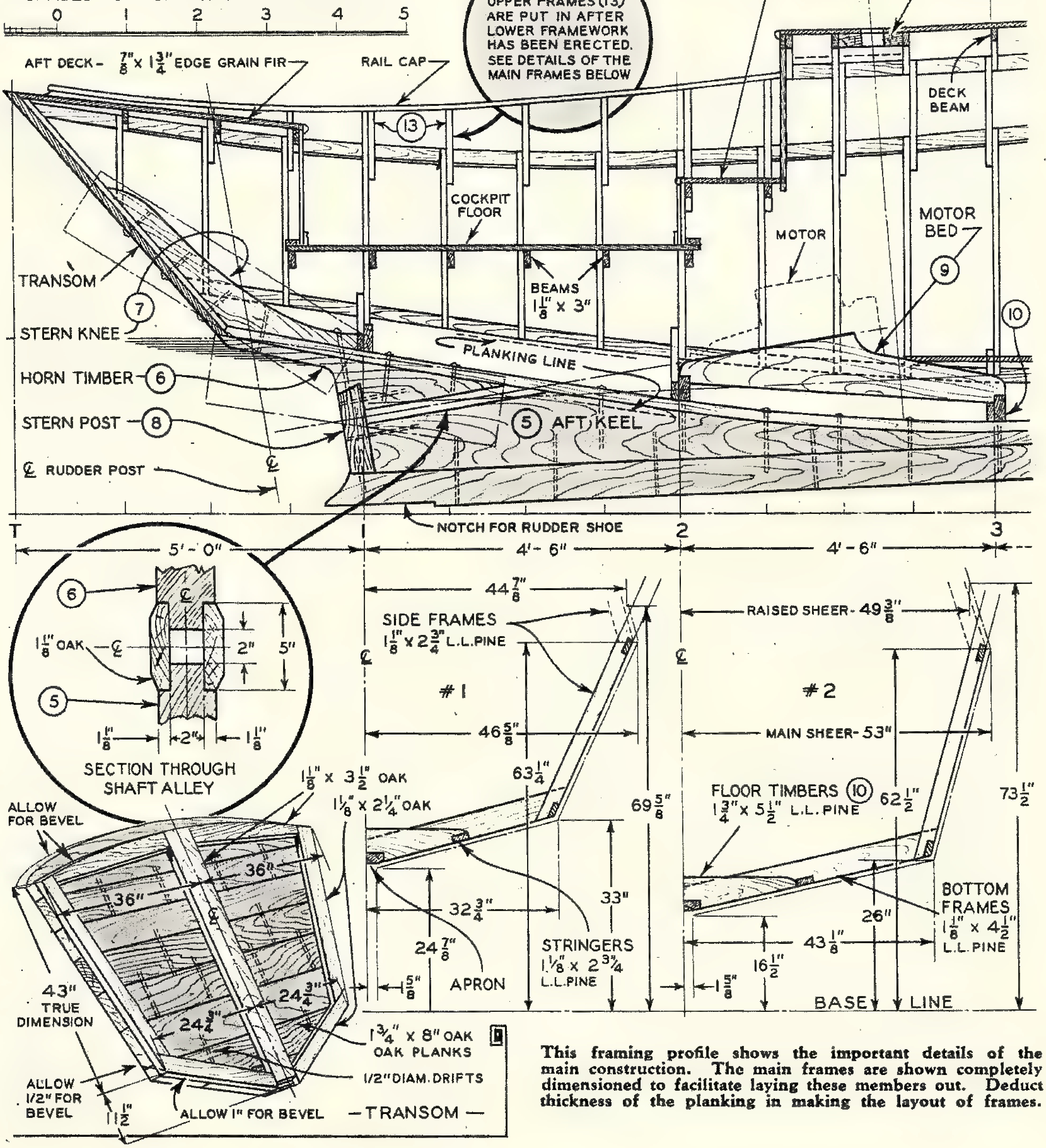


SELF STARTING MARINE MOTOR WITH AUXILIARY SIDE HAND OR FOOT CRANK
GALLEY PUMP
BRIDGE DECK
HELM
COCKPIT FLOOR
MOTOR
FUEL
...G CLOUD
L.W.L.
BASELINE
REVERSE CONTROL
DISH RACK
STOVE
SINK
CABIN FLOOR IS BEST COVERED WITH LINOLEUM
BITT
COMPANION WAY
MOTOR BUFFET
BERTH
FUEL TANK
DOOR
STOWAGE LOCKER
VENTILATED HATCH OVER STEERING GEAR
TOILET ROOM
TRAVELLER
CANVAS COVERED
BERTH
BILGE DOOR
T
1
2
3
4
5
S

FIG. 2- INBOARD PROFILE & ARRANGEMENT PLAN

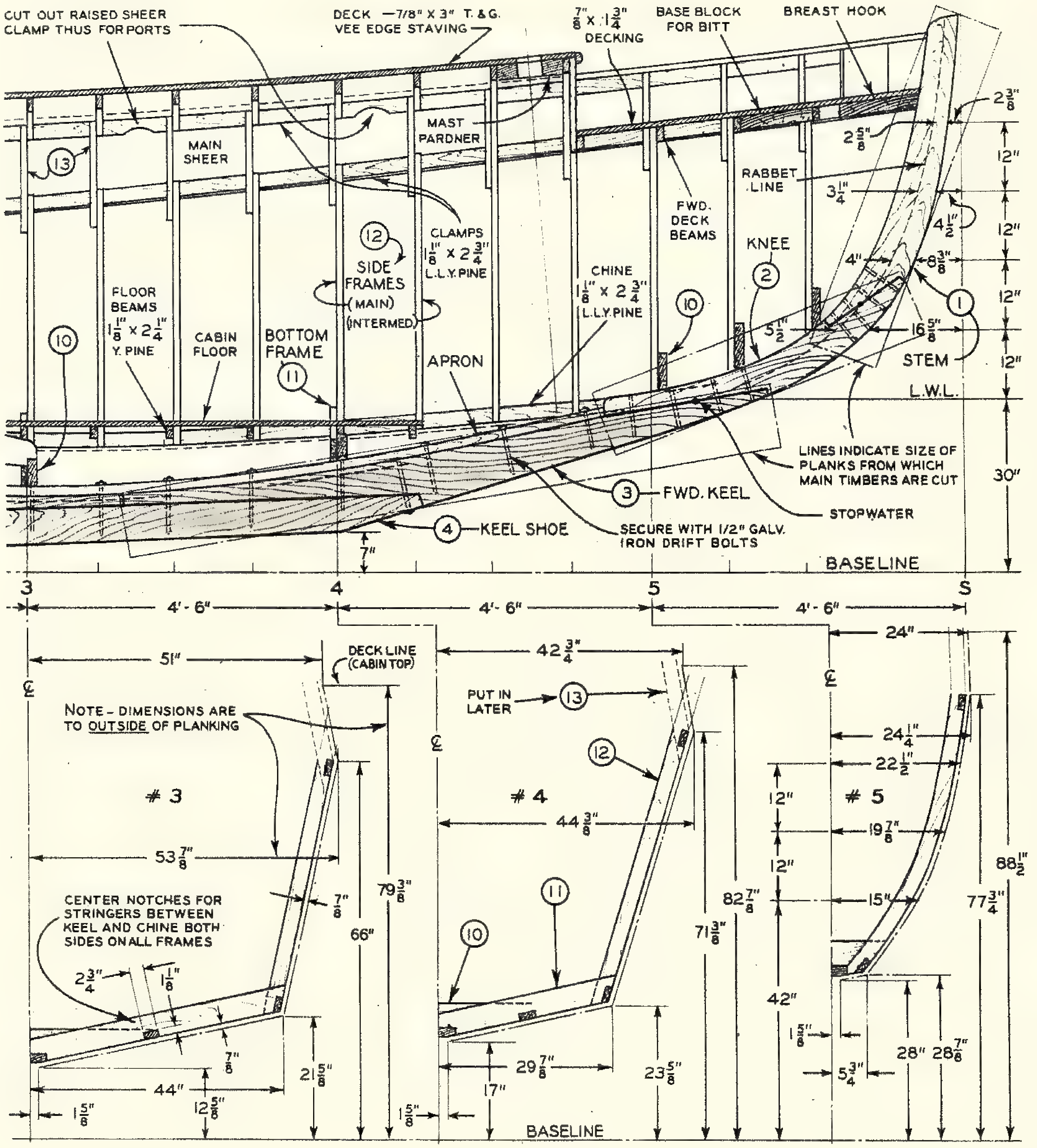
Shown here are the arrangement plans for the ship's interior fittings as well as a profile view of the interior.

FIG. 3 - FRAMING PROFILE AND DETAILS OF THE MAIN FRAMES AND TRANSOM — SHADED PORTIONS SHOW KEEL TIMBERS —


0 1 2 3 4 5
AFT DECK - 7/8" x 1 3/4" EDGE GRAIN FIR
RAIL CAP
NOTE! UPPER FRAMES (13) ARE PUT IN AFTER LOWER FRAMEWORK HAS BEEN ERECTED. SEE DETAILS OF THE MAIN FRAMES BELOW
BRIDGE DECK - 7/8" X 3" T. & G. STAVING - LAID ON 1-1/8" X 3" CROWN BEAMS
MAST PARDNER
DECK BEAM
13
COCKPIT FLOOR
MOTOR
MOTOR BED
9
10
TRANSOM
7
STERN KNEE
BEAMS 1 1/8" x 3"
PLANKING LINE
HORN TIMBER 6
STERN POST 8
5 AFT KEEL
℄ RUDDER POST
NOTCH FOR RUDDER SHOE
T
1
2
3
5'-0"
4'-6"
4'-6"
6
1 1/8" OAK
℄
5
2"
5"
1 1/8"
2"
1 1/8"
SECTION THROUGH SHAFT ALLEY
44 7/8"
SIDE FRAMES 1 1/8" x 2 3/4" L.L. PINE
#1
46 5/8"
63 1/4"
69 5/8"
1 1/8" x 3 1/2" OAK
1 1/8" x 2 1/4" OAK
32 3/4"
33"
24 7/8"
1 5/8"
APRON
STRINGERS 1 1/8" x 2 3/4" L.L. PINE
RAISED SHEER - 49 3/8"
#2
MAIN SHEER - 53"
FLOOR TIMBERS 10 1 3/4" x 5 1/2" L.L. PINE
62 1/2"
73 1/2"
BOTTOM FRAMES 1 1/8" x 4 1/2" L.L. PINE
26"
43 1/8"
16 1/2"
1 5/8"
BASE LINE
ALLOW FOR BEVEL
36"
36"
43" TRUE DIMENSION
24 3/4"
24 3/4"
1 3/4" x 8" OAK OAK PLANKS
1/2" DIAM. DRIFTS
ALLOW 1/2" FOR BEVEL
1 1/2"
ALLOW 1" FOR BEVEL
— TRANSOM —

This framing profile shows the important details of the main construction. The main frames are shown completely dimensioned to facilitate laying these members out. Deduct thickness of the planking in making the layout of frames.

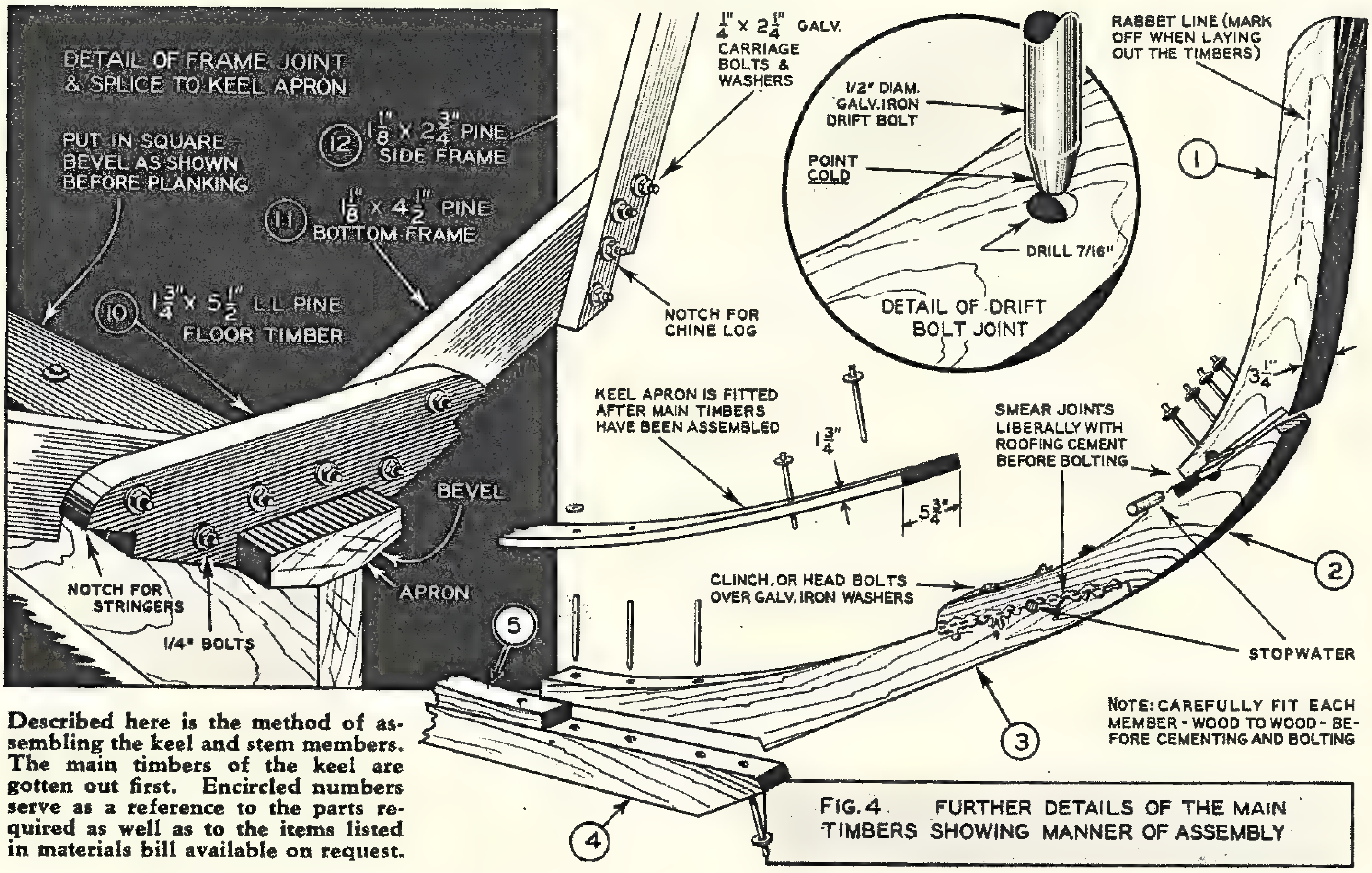
The main frames are now gotten out along with the transom as shown on the plans, deducting the plank thickness, and all joints assembled with ¼" galvanized carriage bolts, the joints should be well painted with white lead. The notches are cut for the keel, stringers, chines and clamps as shown. The notches for the stringers being half way between the keel and chine or in thirds if two stringers are fitted. The stern knee is set on the keel apron and the transom attached to it. This should be perfectly plumbed and either fastened to the shop rafters to keep it so, or braced to the ground with good heavy shores to keep it from moving. The frames are then fastened to the keel, being sure to keep them at perfect right angles to the keel and set perfectly vertical. After all frames are set up they are checked for plumb and squareness and then securely braced to the shop rafters or the ground so that they will not go out of line while the boat is being constructed. If the structure is erected out in the weather it will be well to give it a coat of good



CUT OUT RAISED SHEER CLAMP THUS FOR PORTS
DECK —7/8" X 3" T. & G. VEE EDGE STAVING
7/8" X 1 3/4" DECKING
BASE BLOCK FOR BITT
BREAST HOOK
2 3/8"
12"
2 5/8"
13
MAIN SHEER
MAST PARDNER
RABBET LINE
3 1/4"
12"
4 1/2"
FWD. DECK BEAMS
KNEE
12
CLAMPS 1 1/8" x 2 3/4" L.L.Y. PINE
4"
8 3/8"
SIDE FRAMES (MAIN) (INTERMED.)
2
12"
CHINE 1 1/8" x 2 3/4" L.L.Y. PINE
1
FLOOR BEAMS 1 1/8" x 2 1/4" Y. PINE
10
10
5 1/2"
16 5/8"
12"
CABIN FLOOR
BOTTOM FRAME
STEM
11
APRON
L.W.L.
LINES INDICATE SIZE OF PLANKS FROM WHICH MAIN TIMBERS ARE CUT
30"
3 — FWD. KEEL
STOPWATER
4 — KEEL SHOE
SECURE WITH 1/2" GALV. IRON DRIFT BOLTS
7"
BASELINE
3
4
5
S
4'-6"
4'-6"
4'-6"
24"
51"
DECK LINE (CABIN TOP)
42 3/4"
℄
PUT IN LATER
13
NOTE - DIMENSIONS ARE TO OUTSIDE OF PLANKING
℄
24 1/4"
℄
22 1/2"
12
# 3
# 4
12"
# 5
44 3/8"
19 7/8"
53 7/8"
12"
88 1/2"
11
82 7/8"
15"
77 3/4"
CENTER NOTCHES FOR STRINGERS BETWEEN KEEL AND CHINE BOTH SIDES ON ALL FRAMES
7/8"
79 3/8"
10
71 3/8"
66"
2 3/4"
1 1/8"
42"
1 5/8"
7/8"
21 5/8"
29 7/8"
23 5/8"
28"
28 7/8"
44"
12 5/8"
17"
5 3/4"
1 5/8"
1 5/8"
BASELINE

paint to protect it. This should be the procedure even if the boat is built under cover as wood will last a lot longer if properly protected. The best paint to use is one of the new aluminum primers, now on the market either purchased ready mixed or mixed by yourself.

With the frames and transom properly braced, the chines and clamps are bent in, thus tying the structure together rigidly. In bending the chines and clamps the best procedure to follow is to bend them in pairs, thus equalizing the strain on the two sides of the boat. They are best pulled together with a block and fall fastening them to the stem and working aft. They should be procured in one piece if possible, and if this is not possible a butt joint should be made with a reinforcing piece at least three feet long backing up the joint. The intermediate frames are now fitted starting from the transom and working forward. Forward of main frame number four they will begin to take curvature and the shape of these frames is obtained by bending thin strips of wood between frame three and the stem and picking up the shape from these strips or ribbands. The stem rabbet is cut by the same


DETAIL OF FRAME JOINT & SPLICE TO KEEL APRON
PUT IN SQUARE BEVEL AS SHOWN BEFORE PLANKING
⑫ 1⅛" x 2¾" PINE SIDE FRAME
⑪ 1⅛" x 4½" PINE BOTTOM FRAME
⑩ 1¾" x 5½" L.L. PINE FLOOR TIMBER
BEVEL
APRON
NOTCH FOR STRINGERS
1/4" BOLTS
1/4" x 2¼" GALV. CARRIAGE BOLTS & WASHERS
NOTCH FOR CHINE LOG
1/2" DIAM. GALV. IRON DRIFT BOLT
POINT COLD
DRILL 7/16"
DETAIL OF DRIFT BOLT JOINT
RABBET LINE (MARK OFF WHEN LAYING OUT THE TIMBERS)
①
3¼"
KEEL APRON IS FITTED AFTER MAIN TIMBERS HAVE BEEN ASSEMBLED
1¾"
5¾"
SMEAR JOINTS LIBERALLY WITH ROOFING CEMENT BEFORE BOLTING
②
CLINCH, OR HEAD BOLTS OVER GALV. IRON WASHERS
STOPWATER
⑤
③
④
NOTE: CAREFULLY FIT EACH MEMBER - WOOD TO WOOD - BEFORE CEMENTING AND BOLTING

Described here is the method of assembling the keel and stem members. The main timbers of the keel are gotten out first. Encircled numbers serve as a reference to the parts required as well as to the items listed in materials bill available on request.

FIG. 4 FURTHER DETAILS OF THE MAIN TIMBERS SHOWING MANNER OF ASSEMBLY

method. The upper frames are now fitted by making patterns at the main frames and fitting the upper frames at these points. The upper clamps are now bent in and the intermediate upper frames set to match the lower ones. Tops of the main frames should be well braced to take the strain of bending the upper clamps.

A pattern of the deck beams is now made to the curvature shown on the plans and the upper clamp trimmed off to suit this curvature. The top frames are also sawed off to suit this crown. The beams are now gotten out and dovetailed into the upper clamps. Fit all beams all the way across the boat and cut them out for the companionway later. Now is also a good time to fit all cockpit and cabin floor beams before the planking is in place as securing good fits is easier at this time as well as having the beams in to take planking strains. Mast pardners as well as base blocks for bitts and cleats will be much easier to fit now and these should be attended to before the planking and decking goes on. The whole of the structure should now be thoroughly painted. The chines and apron should be beveled to suit the bottom planking by laying a straight edge between the chine and keel, and drain holes should be cut in all of the bottom timbers to allow the free passage of bilge water to the pump. Now is also a good time to fit the gas tank and the fresh water tanks as well as motor control rods and electric wiring that will be difficult to get to later.

The side planking is now fitted and may be run in parallel strakes or evenly divided between chine and sheer as the owner so desires. If run in parallel strakes, stealer planks will have to be run in at the sheer and chine to fill out the additional girth forward. These should not end in sharp points but be nibbed into the plank directly below them. The edges of the planks should be outgaged so that they are an eighth inch open on the outside for caulking. No side plank should exceed eight inches in width. The planks should be screwed to the stem and transom but nails may be used to attach them to the frames. Butts of the side planks should be spaced well apart to preserve the strength. The bottom planks are laid athwartship at about forty-five degrees to the keel and treated the same as the side planks. A strip of flannel or old woolen cloth should be inserted between the chine and planking as well as the apron and the bottom. This flannel or wool should be smeared with Staytite reduced a little with linseed oil to about the consistency of thick molasses. The cement should be just thin enough to squeeze out when the planks are set up if a good tight joint is desired. Black Staytite is recommended for work below the water line and the gray for work above. Never use the black cement

[*Continued on page* 130]

New York Boy Wins Junior Birdmen Championship

ATTRACTING contestants from throughout the United States, the Junior Birdmen of America organization held its National Indoor Championship contest at San Antonio, Texas. Lynn Radcliffe, of Syracuse, N. Y., was declared champion when his model flew for 15 minutes, 20.2 seconds.

Radcliffe and Robert Amos, of San Francisco, Calif., who placed second, used model planes featuring micro-film covered wings and propellers to secure minimum weight.

Lynn Radcliffe, of Syracuse, N. Y. (right), won the Junior Birdmen of America indoor championship at San Antonio, Texas. Robert Amos, of San Francisco, Calif., was runner-up. Both used micro-film covered models to insure least weight.

Soviet Divers Raise Ship

Covered with barnacles and other sea growths, the hulk of the steamer *Doris* has been raised from the bottom of the Black Sea by Soviet divers. Ship was sunk during 1918.

SOVIET divers have successfully raised the steamer *Doris* from the bottom of the Black Sea near Sebastopol, Crimea. The ship was sunk in 1918 during a storm.

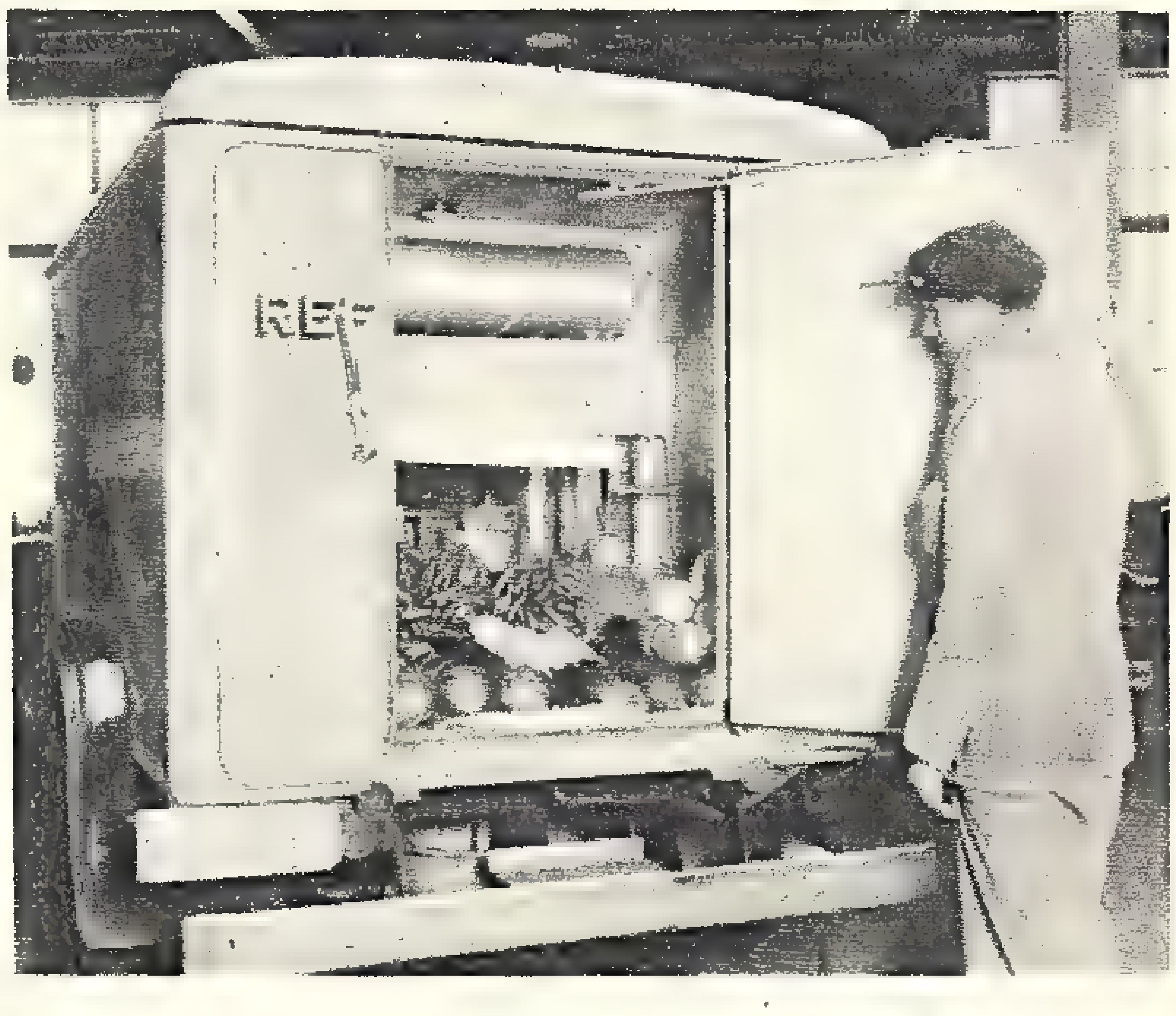
The sides and equipment of the vessel were encrusted with a thick growth of barnacles, adding to its weight and complicating the efforts of the salvage crew. Several previous attempts had been made to raise the ship.

Truck Refrigerator Devised

A NEW type of refrigeration unit for trucks in which no compressors or other mechanism is used has been developed. The entire device can be quickly installed in any new or old enclosed truck.

The installation consists of a unit charged with a liquid refrigerant, and a heat-radiating device charged with a liquid chemical which absorbs gas evaporating in the refrigerating unit. Both are refillable.

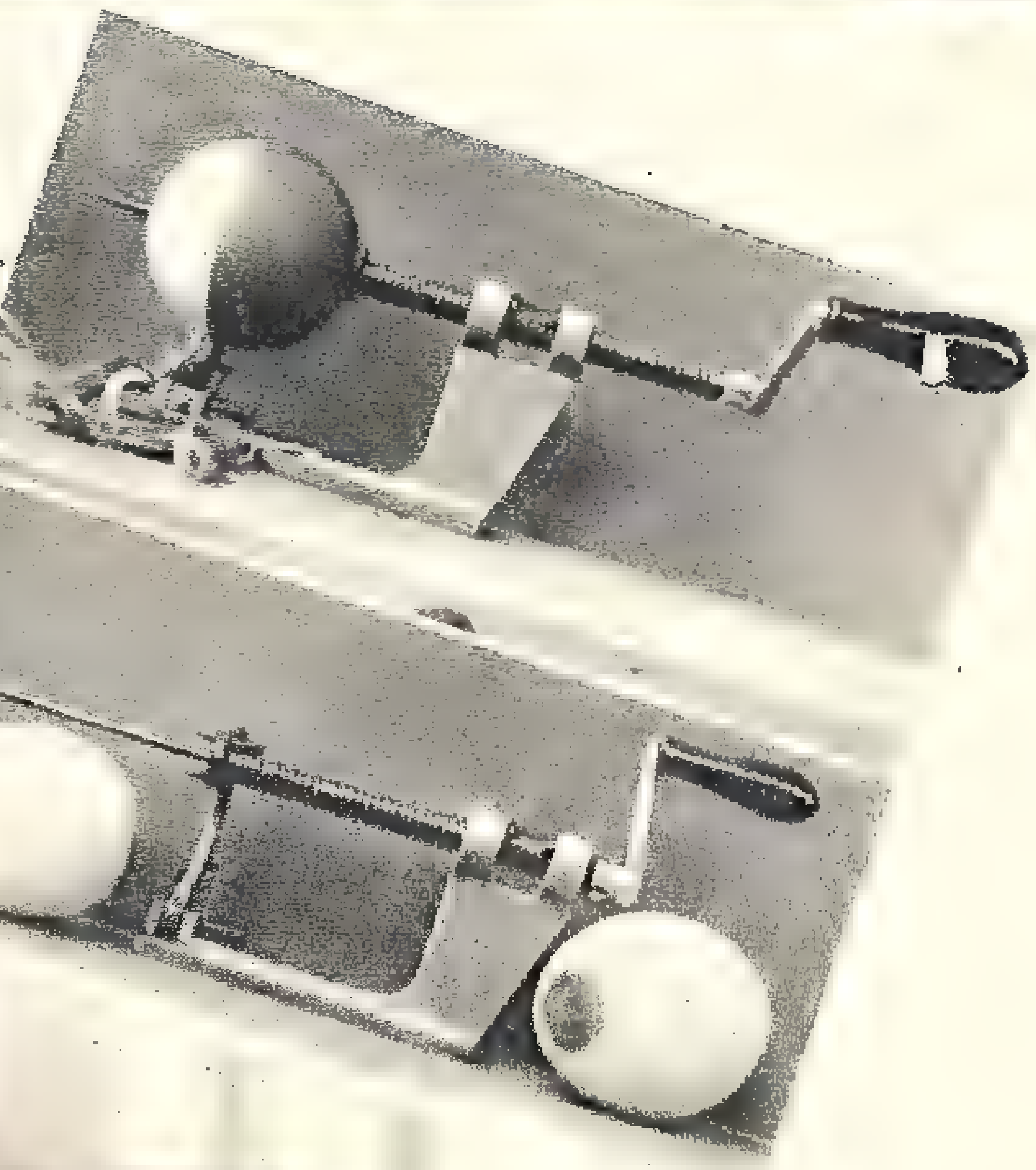
A full charge of liquid refrigerant lasts 48 hours in hot weather and the truck driver can control the temperature of the chamber through the medium of a simple valve. The device can be shut off when not needed, effecting savings in chemicals used.



No compressor is used in this truck refrigerating unit. A liquid refrigerant and a chemically-charged device that absorbs gas evaporating from the refrigerant is its secret.

Household Aids For Milady

This young lady is storing leftovers in the triple food saver compartment of her new model electric refrigerator. Another feature to delight the modern housewife is a special compartment for keeping fruits and vegetables. Greater economy in operating and maintenance cost is claimed for the 1937 refrigerators.



Simple in construction, this orange peeling device was invented by Ernesto Cancio Erro, of Havana, Cuba. It is designed to peel half a dozen oranges per minute and efficient and reliable operation is claimed. Taking little space, the device can be set up either horizontally or vertically. Its reversible knife has two cutting edges. Photos show two steps in peeling.

Kept in a lower drawer when not in use, this handy portable deep-well electric cooker is thermostatically controlled and can be used for any cooking purpose with a minimum of time and expense. The gleaming white cooker can be attached to outlets on an electric range or to any convenient outlet.

This safety type wringer was invented by H. L. Morin, of Holyoke, Mass. Clothes are fed to wringer on perforated feed belt and should hand accidentally follow, it raises upper guide which causes mercury switch to stop the wringer.

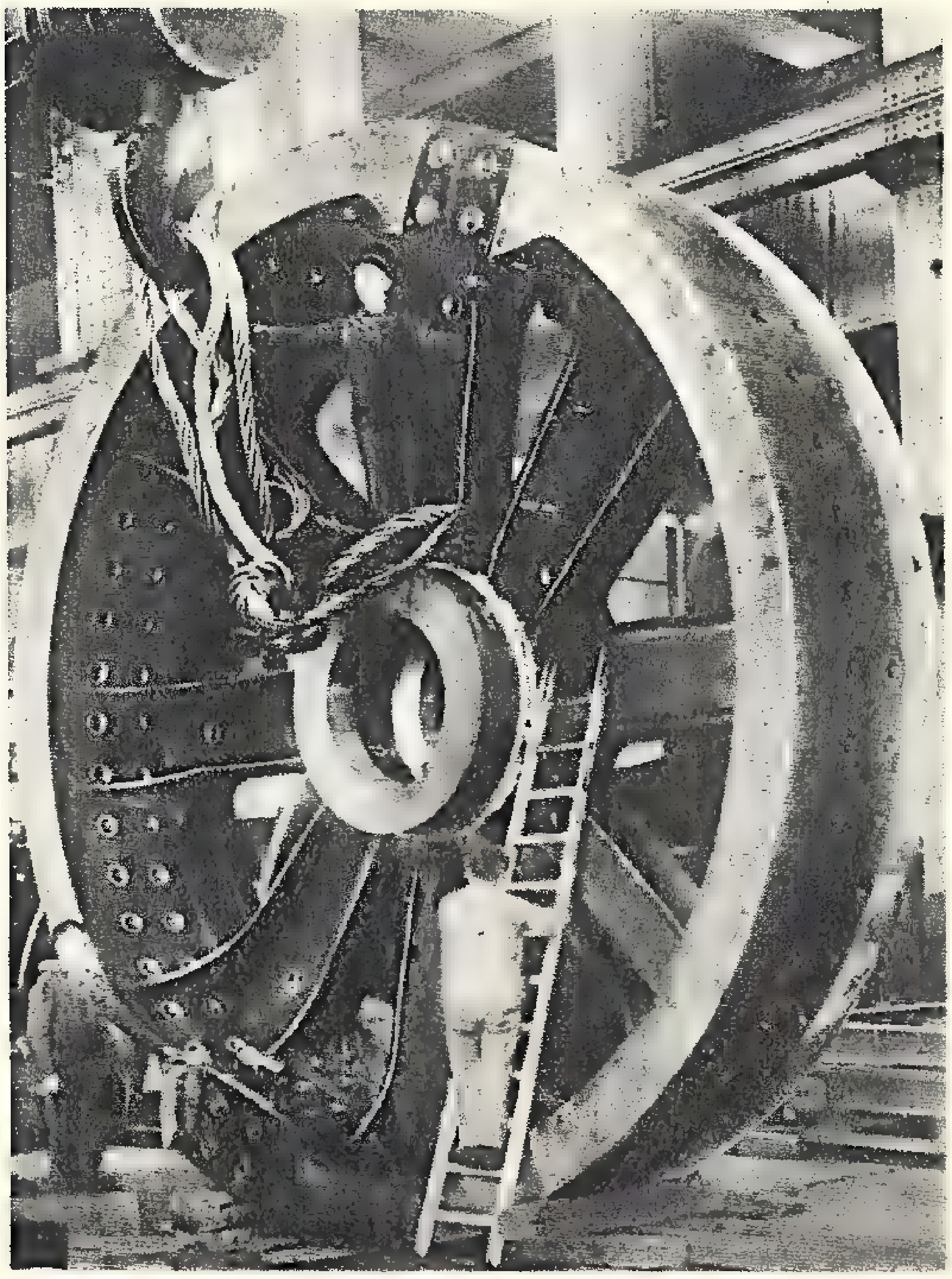
Diesel Locomotive Used In Underground Tube

WORKING in a tunnel 95 feet below the streets of London, England, a Ruston Diesel powered locomotive is being used to haul the heavy loads of supplies and dirt involved in the construction of a tube to link the Bakerloo and Metropolitan Railways. The exhaust gases from the engine are removed from the tunnel through use of a patented filter device.

The Diesel locomotive is said to haul heavier loads and to be more economical in operation than the regular gasoline powered engines usually used for similar work.

This Diesel powered locomotive is used to haul heavy loads in a tunnel 95 feet below the streets of London, England. Exhaust fumes are removed from tunnel by a filter device.

Wheel Weighs 500 Tons



Weighing 500 tons and standing over 25 feet high, this huge wheel will be part of a German-built generator that will supply electricity for an entire South American country.

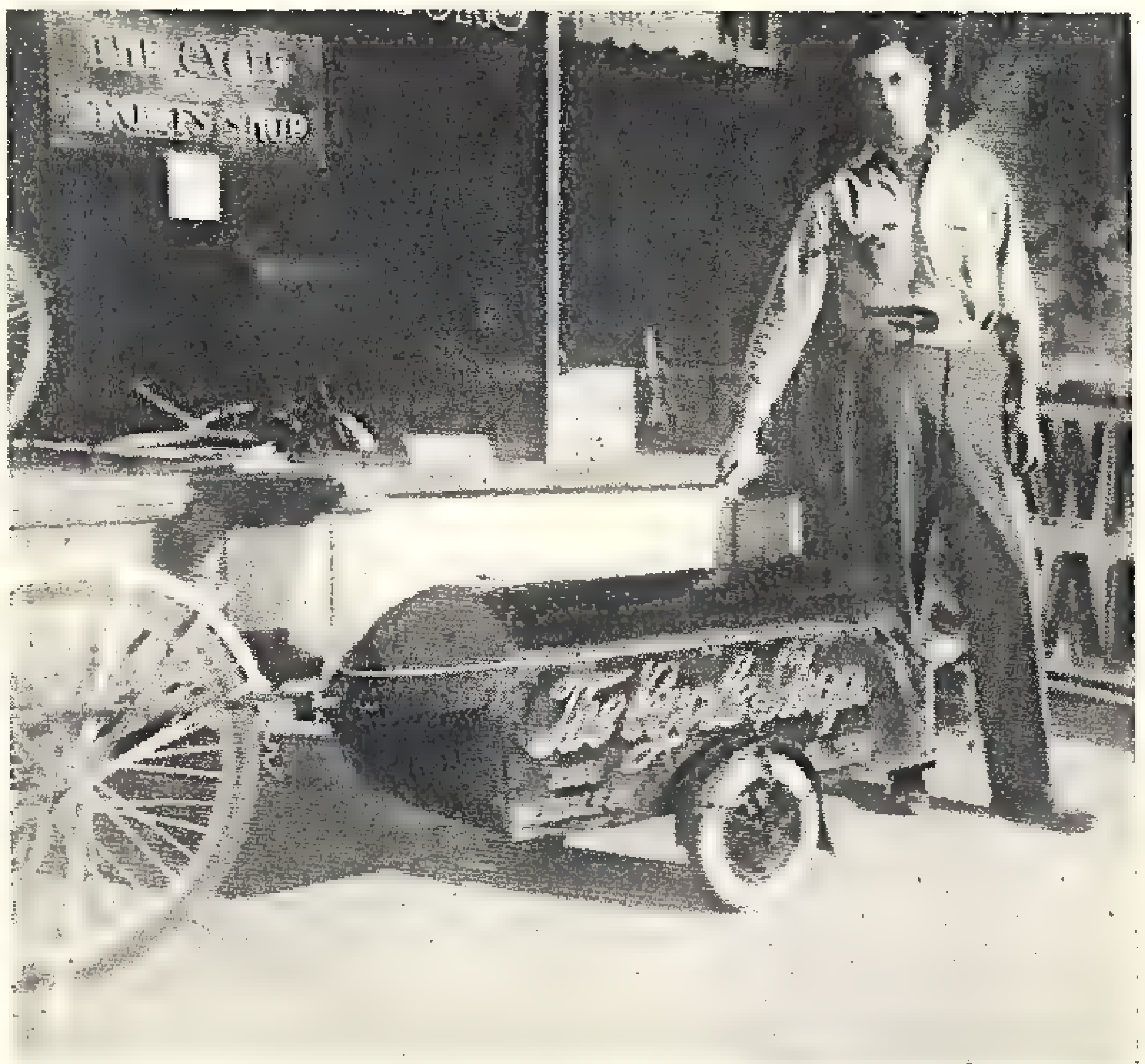
A GIANT generator wheel weighing 500 tons and having a shaft weighing 35 tons has been built by an electric equipment manufacturer in Berlin, Germany. The outside diameter of the huge wheel is over 25 feet.

The wheel is part of a water power generator being constructed for the government of Uruguay to help supply its electric power. The finished generator will have two of the massive wheels and will be shipped in sections due to its great weight and bulk.

Bicycle Trailer Has Radio

FEATURING a built-in radio, a midget bicycle trailer weighing 60 pounds has been constructed by William Moll, of Minneapolis, Minn. The radio is dialed from the handlebars of the towing bicycle.

Two hinged doors keep the trailer interior dustproof and ample room is provided for a tent, gas stove, food, and other camping equipment. A 6-volt battery supplies current for tail lights mounted on a small bumper as well as for the radio receiving set. The trailer is streamlined and designed to ride low on midget tires, being five feet long and two and one-half feet wide.

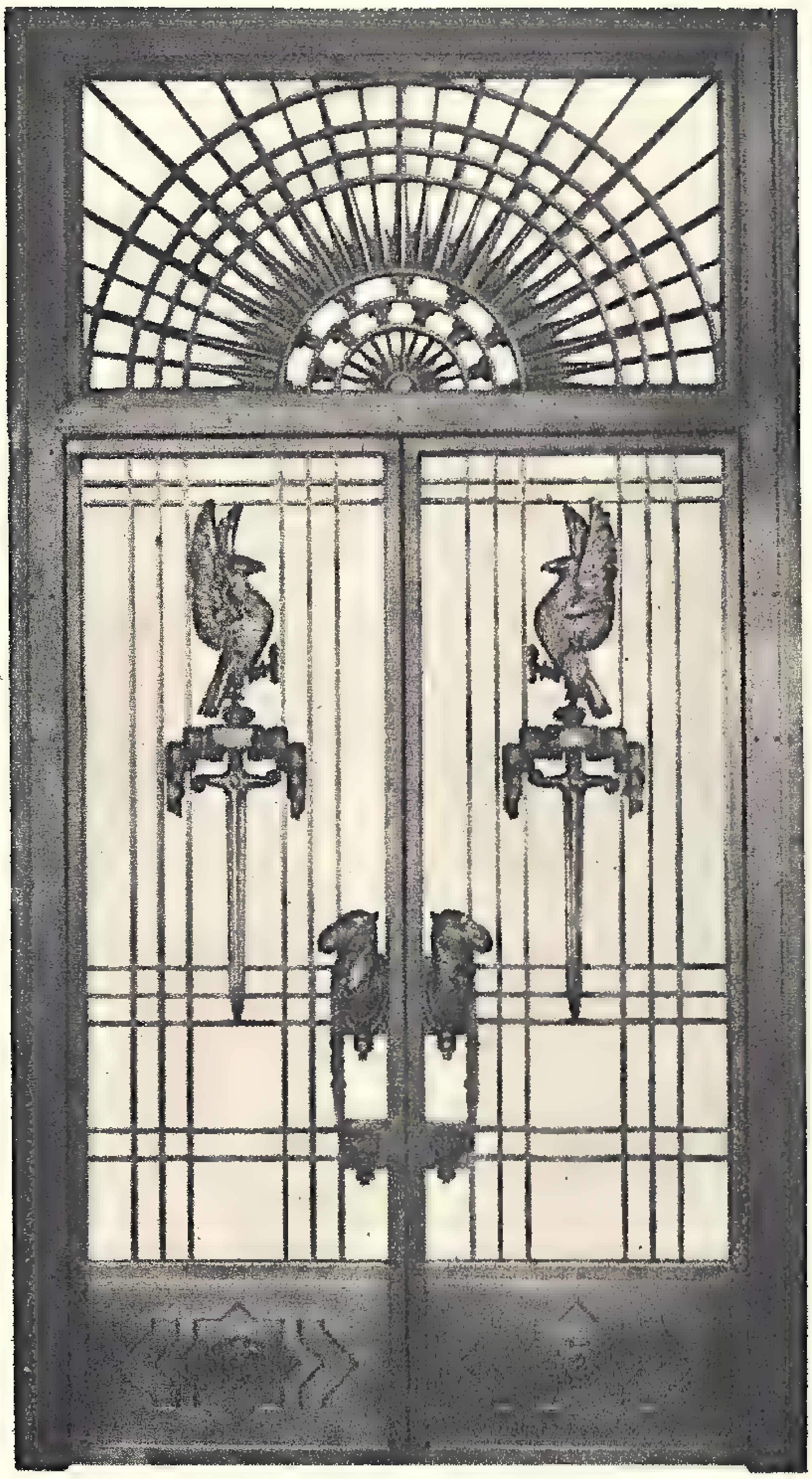


Designed for camping or delivery use, this midget bicycle trailer built by William Moll, of Minneapolis, Minn., has a built-in radio controlled from the bicycle's handlebars.

Western Craftsmen Add To Glory Of Fabulous East

WESTERN craftsmanship has been utilized to add a modern lustre to the mystic East with the casting in Birmingham, England, of a pair of bronze doors for the palace of the Maharaja of Jodhpur. Twelve feet, six inches high and six feet wide, each door weighs 1,500 pounds. Each bears an eagle and sword motif on both sides, is richly modeled in relief and hand chased. The grip handles comprise camel heads with tasseled halters. The doors will grace an entrance to one of the palace's many ornate halls.

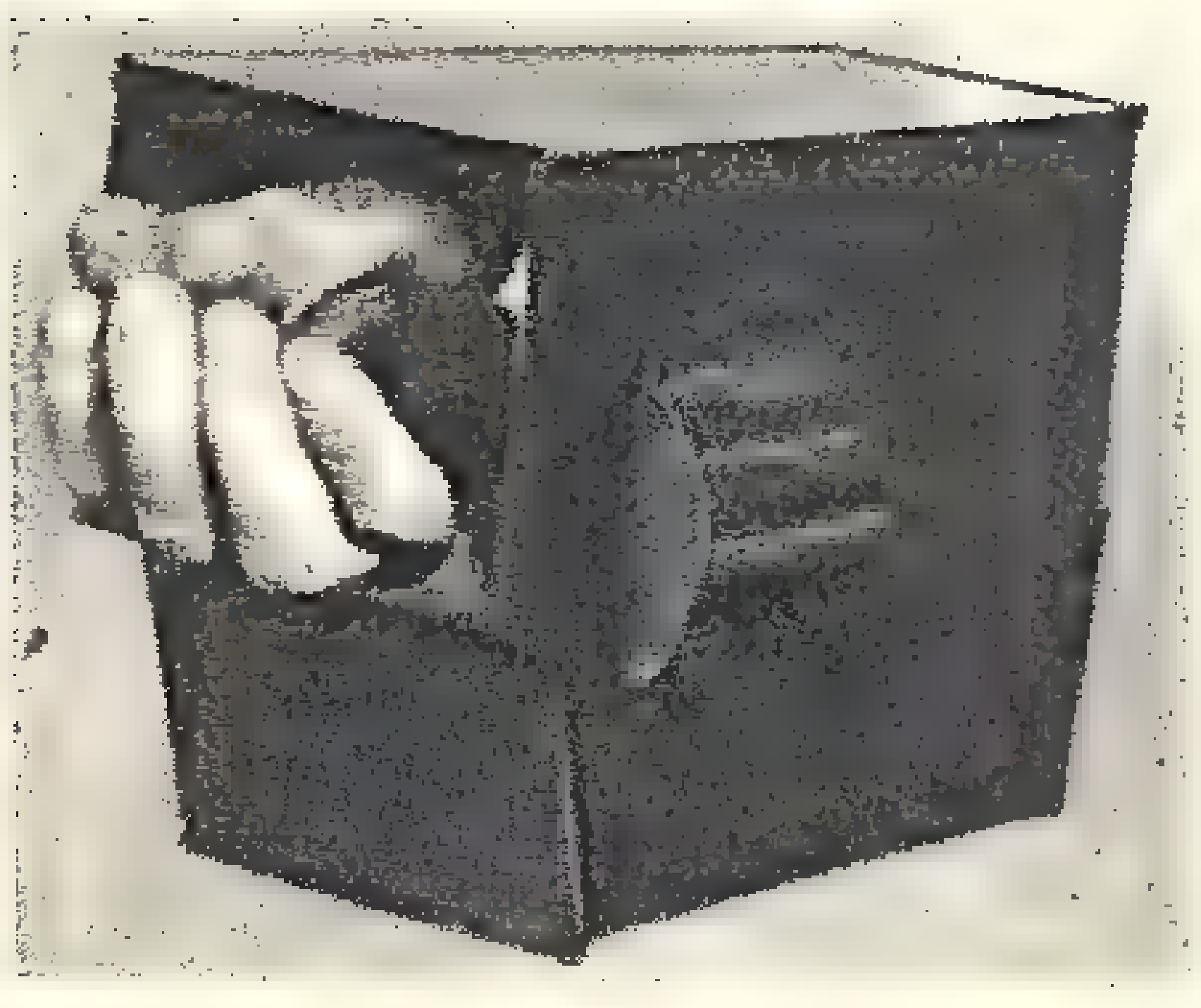
The palace, a large and handsome building overlooking the city of Jodhphur, built in 1459, is itself contained within a massive fort which stands on an isolated rock 200 feet above the heavily walled and historic city on the plains. The Maharaja of Jodhphur is considered to be one of the most wealthy of India's native rulers.



These exquisite 3,000-lb. bronze doors were cast by English craftsmen in Birmingham, England, for the centuries-old palace of S. Maharaja of Jodhpur, wealthy Indian potentate.

"Fist" Aids Berry Pickers

GUARDING the hands of berry pickers in the fruit patches of California, a "mailed fist" is the latest aid to labor. It slips over the the hand, leaving thumb and fingers clear. The berries drop onto a curved deflector lying snugly in the palm, which by-passes them into a bottom compartment to be emptied into boxes.



This "mailed fist" speeds berry picking and protects the hands.

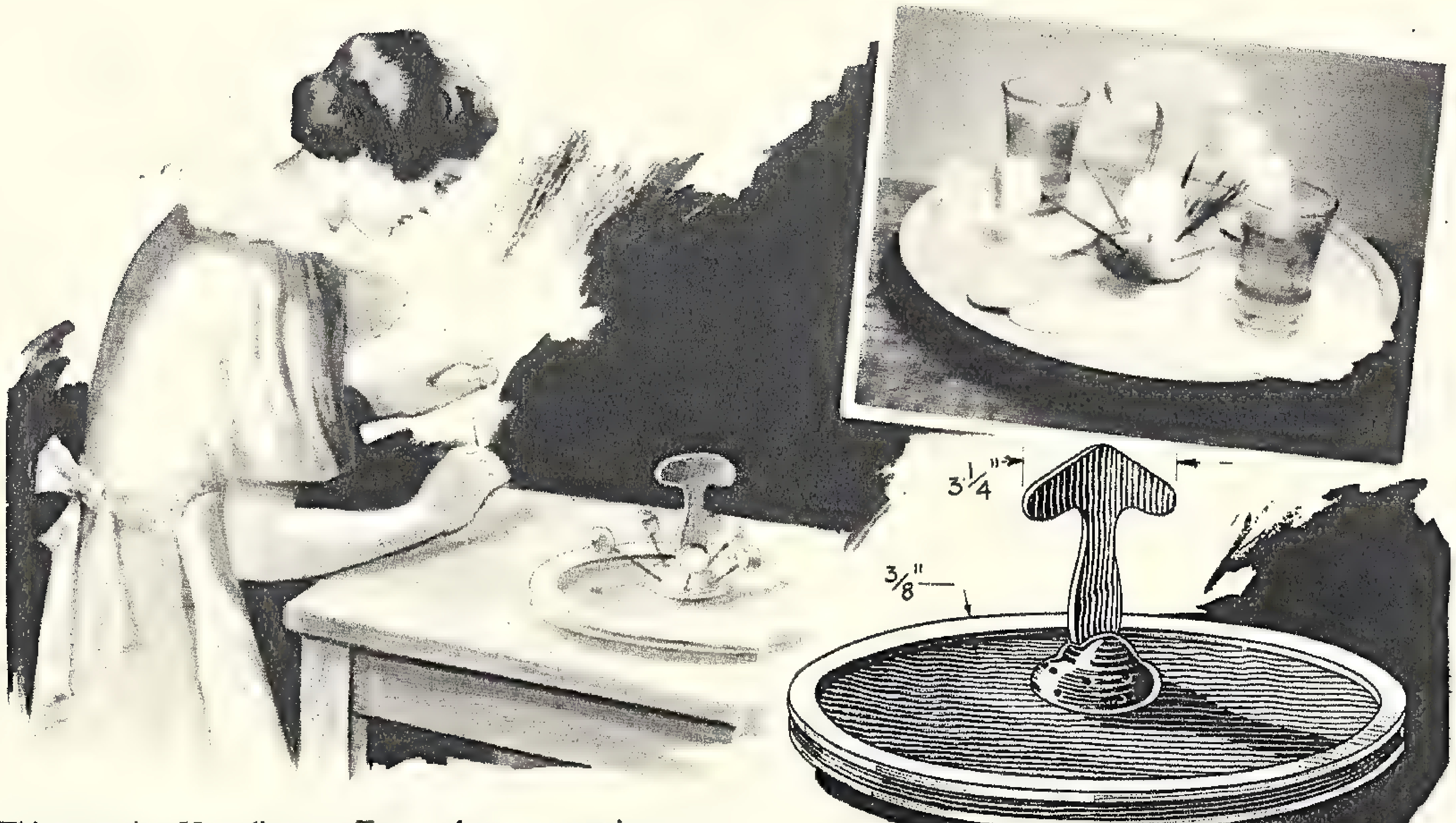
Floating PO For Ships

Claimed to be the world's only floating post office, this tug cruises on the Detroit River, picking up and delivering mail to freighters plying the Great Lakes, making 25,000 contacts annually.

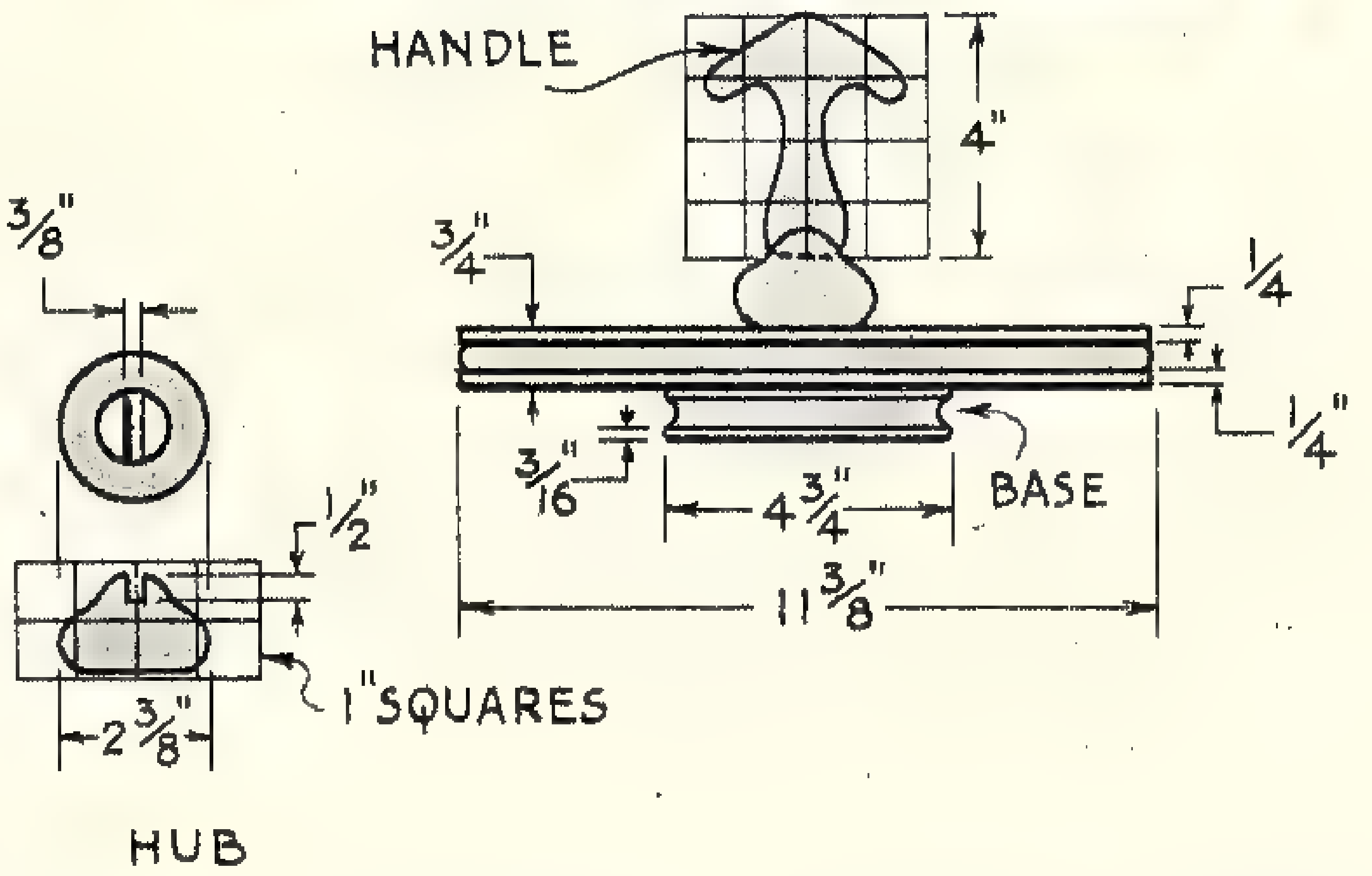
MAKING 25,000 connections annually with freighters that ply the Great Lakes, what is claimed to be the world's only floating post office is a small tug that cruises the Detroit River, picking up and delivering an average of 3,000 letters, 150 newspapers and magazines and 75 parcels a day. The floating post office pulls alongside the boats, and without either ship stopping, transfers mail to and from vessels by pails and pouches suspended on ropes. The unique service, which even includes handling money orders, was inaugurated because of the uncertain schedules of freight boats. The Detroit River is the location because it is the bottle neck of the Great Lakes, and all boats that sail the lakes go up or down the river at one time or another.

WORKSHOP HOBBIES

Hors-d'oeuvre Tray Is SIMPLE Shop PROJECT



This attractive Hors-d'oeuvre Tray makes an attractive one-evening project for the workshop fan. Constructed from maple plywood and solid stock it requires only a jig saw and lathe for machining. Dimensions of components are shown at right.

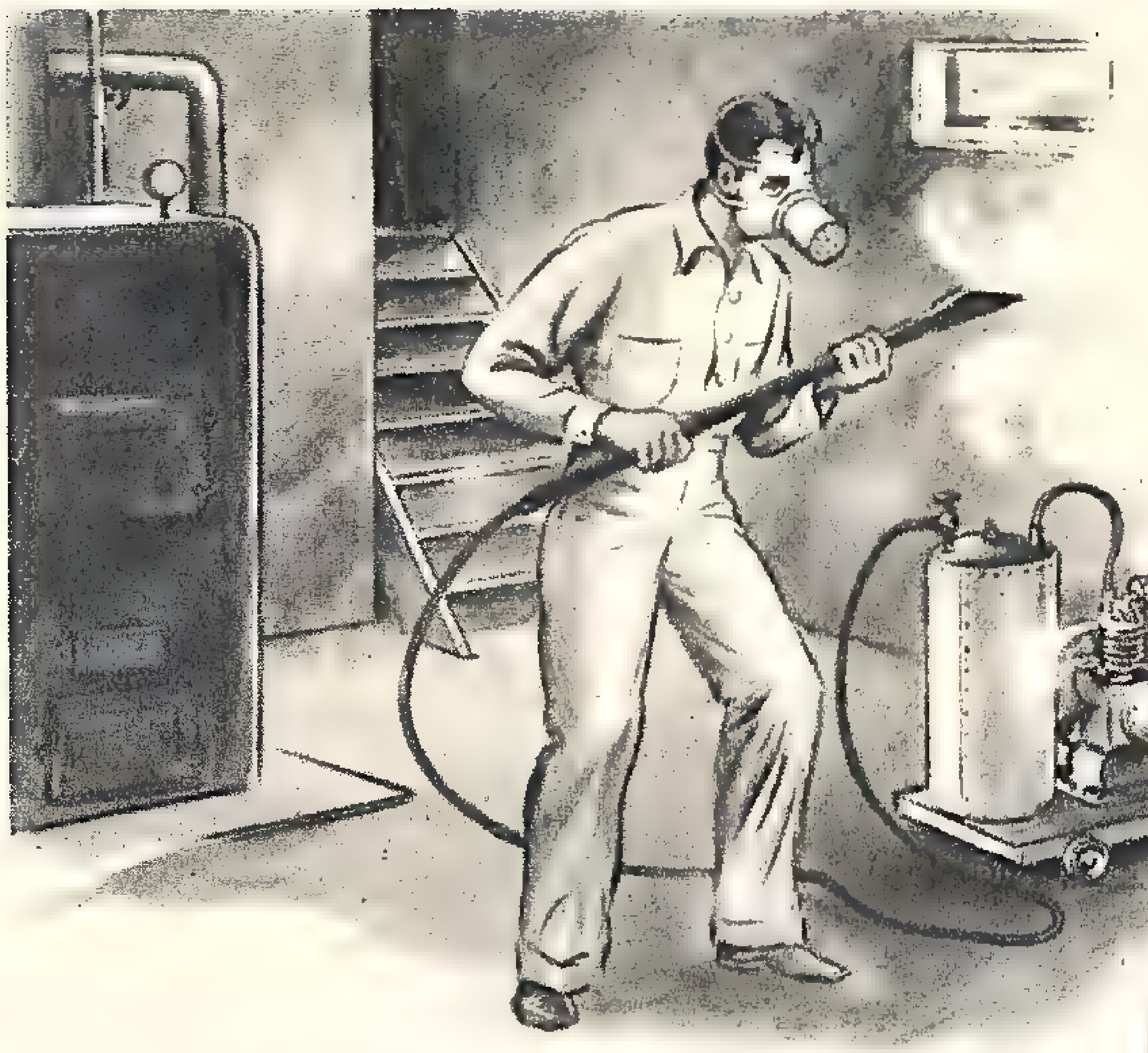


LIGHT refreshments at bridge or tea are more attractively served with this tray. A toothpick hub provides brightly colored skewers for dainty titbits. Ample room is found on the tray itself for sandwiches, beverages and so forth. Construction is obviously simple.

All stock is of maple. Toothpick hub and base, solid. Handle, rim and bottom, plywood. The bottom and rim are both 11⅜" in diameter; ⅜" is the width of the rim. Glue the rim to the bottom and when the glue has set, sand the circumference to a uniform smoothness. Lay off on a piece of ⅜" maple plywood the outline of the handle, using one inch squares. Saw out and sand away the cutting marks.

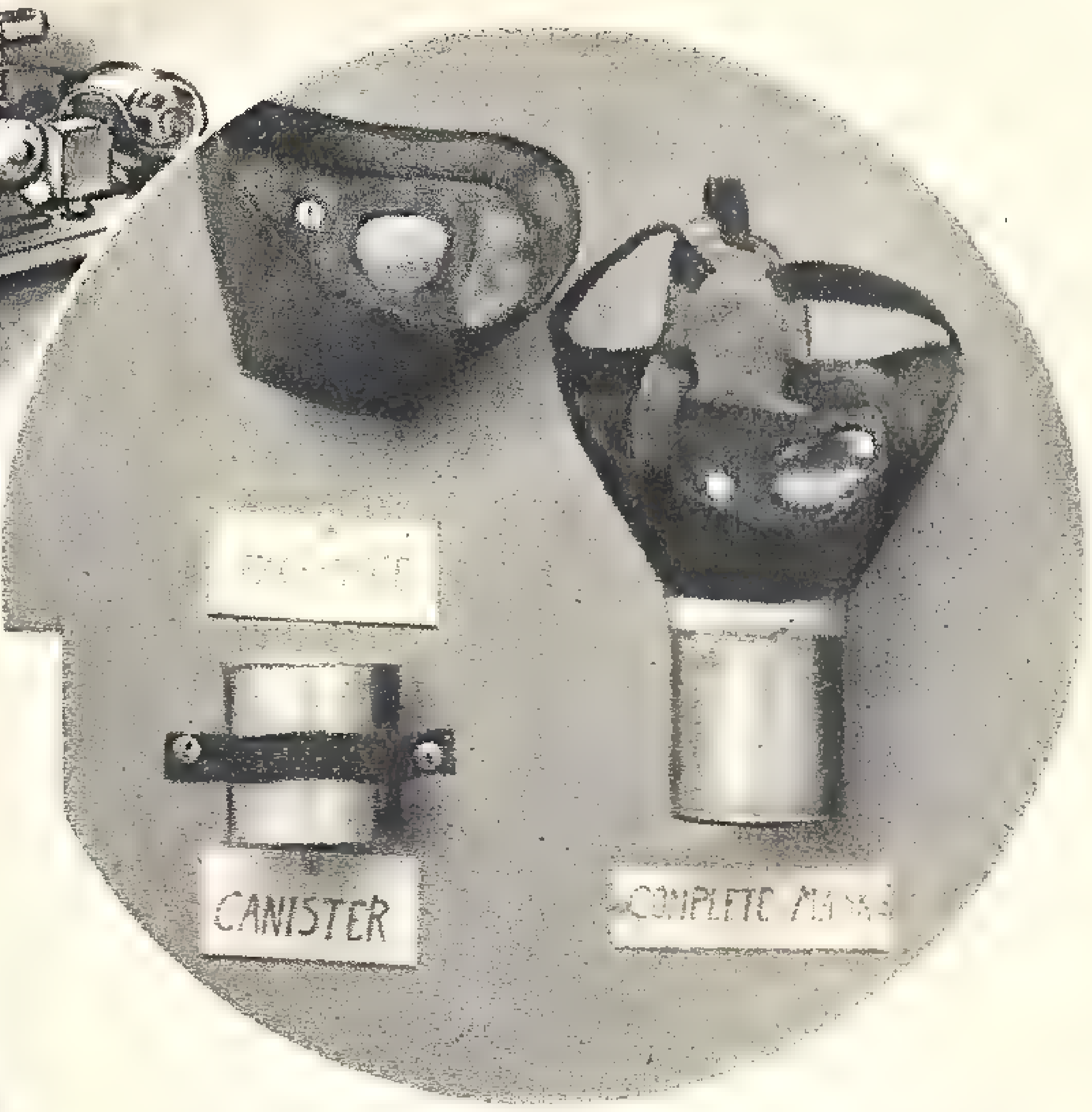
Next we come to the lathe-machined members, the base and toothpick hub. Three-quarter inch stock forms the base, which is first jig-sawed and then turned on the face-plate to the design shown. Sanding is most readily done while the base is in the lathe. A hole should be drilled and countersunk in the center of the base to receive a long wood screw. For the toothpick hub, a template is made according to the diagram, employing 1" squares in the lay-out.

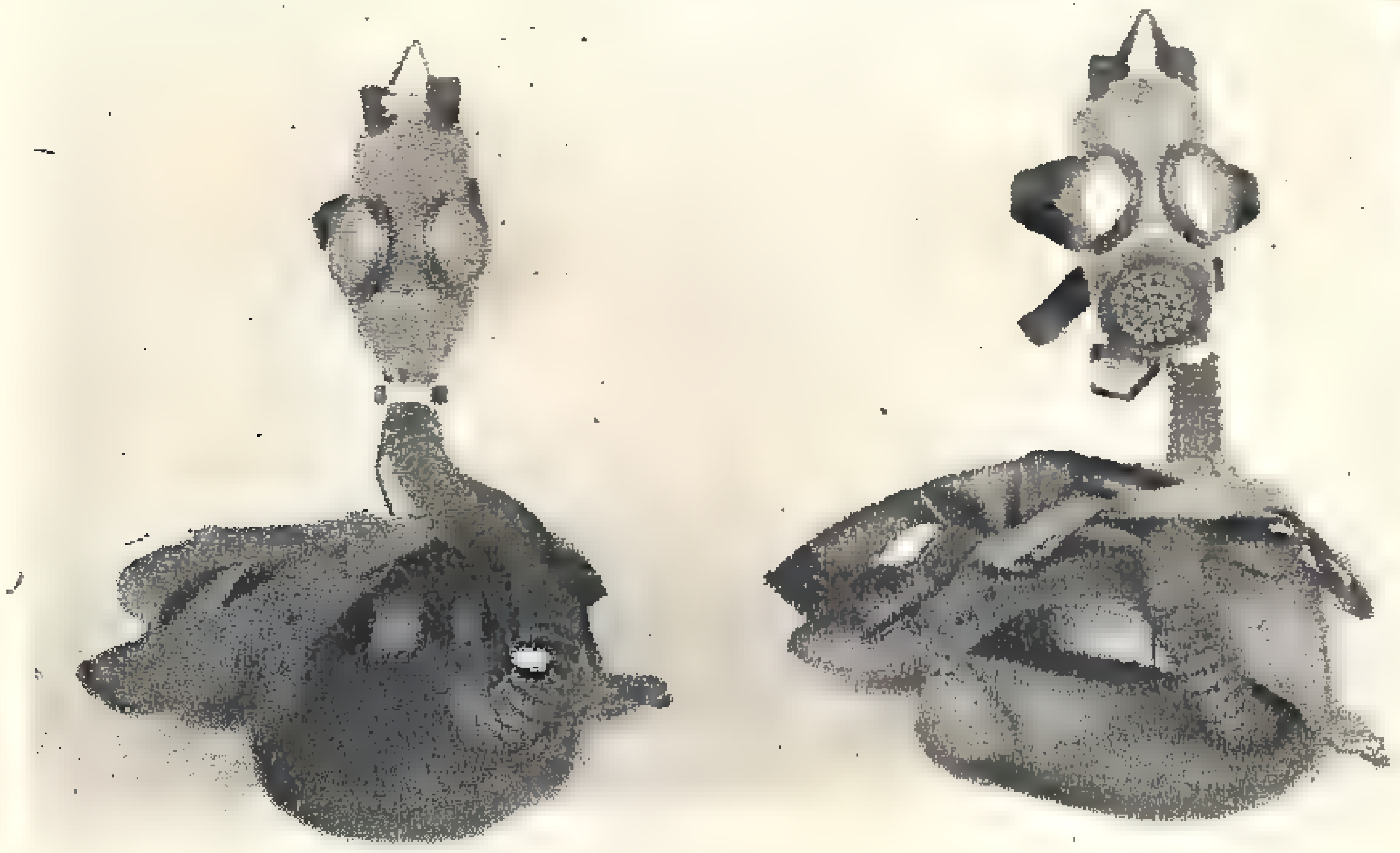
A GAS MASK FOR



An army officer describes the construction of a practical fumigation mask.

A mask for spraying and fumigating purposes is a necessary protection against dangerous fumes. This practical gas mask is made from ordinary household materials.





The completed gas mask and basic materials used in constructing mask are pictured above. Left—Two types of commercial masks of practical design.

A SERVICEABLE gas mask which will prove highly efficient when working in smoke and dust can be easily constructed by anyone from common materials and at little or no cost. While the respirator unit about to be described is not as efficient as some commercial types it is, nevertheless, quite satisfactory for ordinary disinfecting use.

A few pieces of duck cloth, leather, celluloid, a tin container, cotton wadding and activated charcoal comprise the materials used in making the mask. Most any workshop will yield all necessary materials except the activated charcoal and this can be obtained at the corner drug store.

To make the respirator a pattern is first drawn on stiff cardboard to the shape and size shown in the pattern illustration. This size is satisfactory for the average adult. If one has an unusual face, a little experimentation will enable one to make the required changes in dimensions to meet his particular needs.

The facepiece is made from double thickness of tightly woven medium weight waterproof duck or leather which is treated on the contact surface between the layers with boiled linseed oil to which has been added 10% of castor oil.

The two faceblanks are cut from selected duck cloth according to pattern made as outlined above. The contact surfaces of the facepieces are dampened with the oil and then stitched in place by hand prior to sewing on a shoe machine. With a little patience all the sewing can be done by hand.

Eyepieces are next cut from clear celluloid or cellulose acetate film in the form of squares approximately three inches on the side with

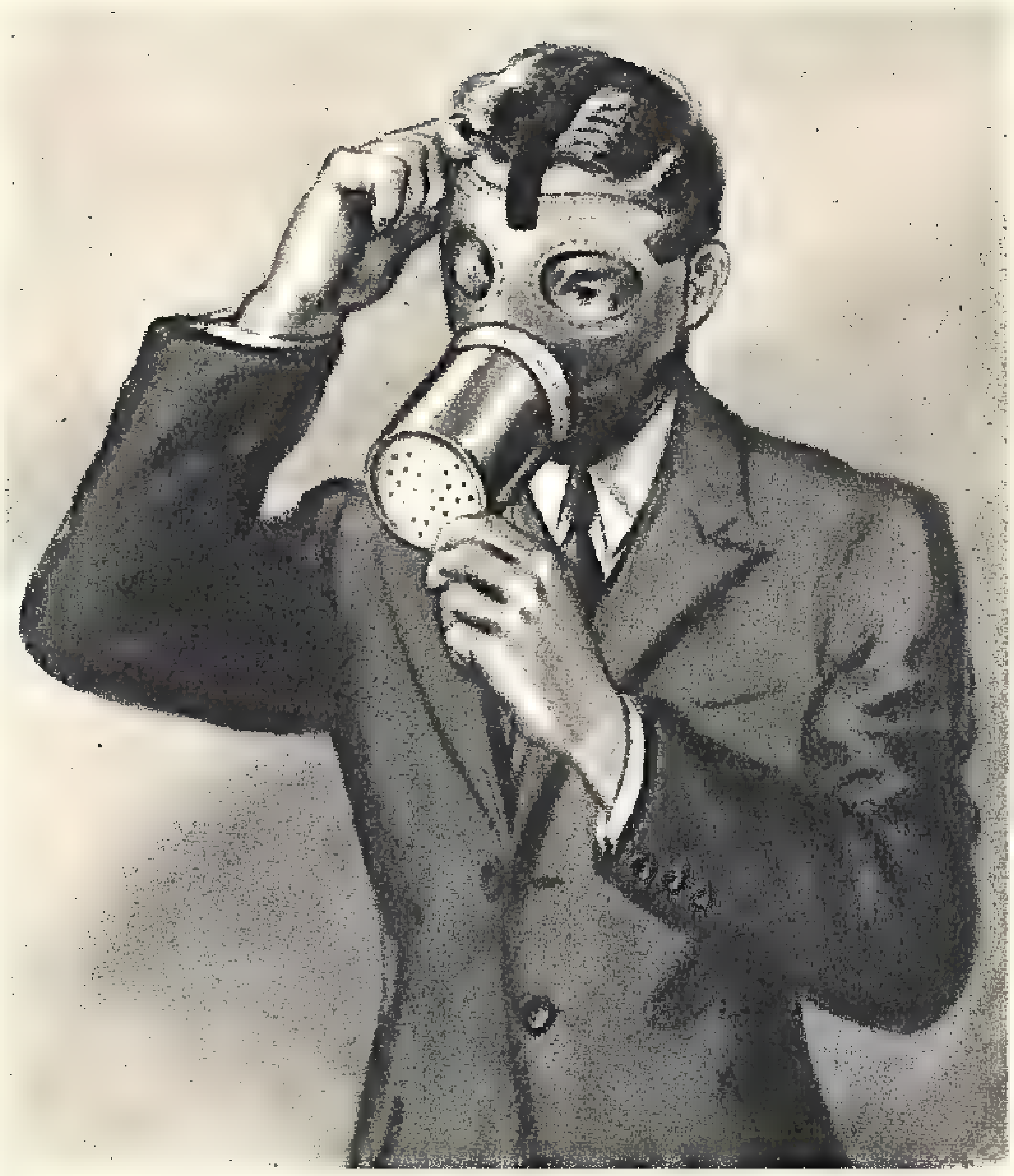
Fumigating Purposes

by Major M. E. Barker, C.W.S.

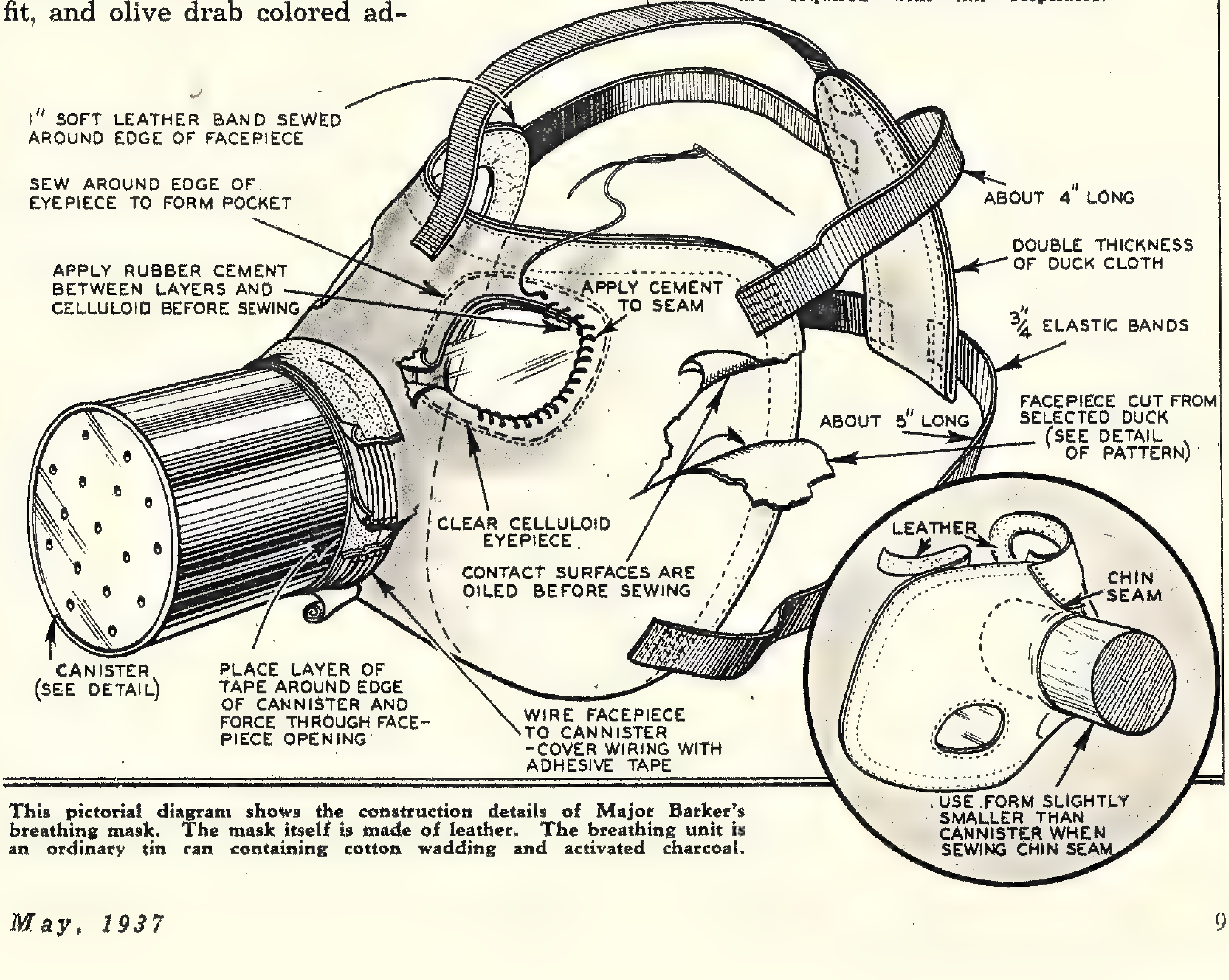
the corners rounded. The eyepieces are then slipped in place between the two layers of the facepiece and the facepiece sewed around the edge of the eyepiece. Cellulose acetate or rubber cement is then applied between the lens and the two layers of the facepiece and the facepiece is sewed through the eyepiece and cement applied to the seam. This procedure is necessary in order to produce a gas tight fit of the eyepieces in a facepiece of this design.

A band of soft leather about one inch wide is cut to fit the inside of the facepiece. This is sewed in place with two seams. The purpose of the soft leather is to give an air tight fit between the edge of the facepiece and the face.

The chin seam is now put together over a piece of wood slightly smaller than the tin can to be used as a canister. The chin seam is thoroughly sewed in place, the leather band inside the outer edge of the facepiece is cut to give a snug fit, and olive drab colored ad-

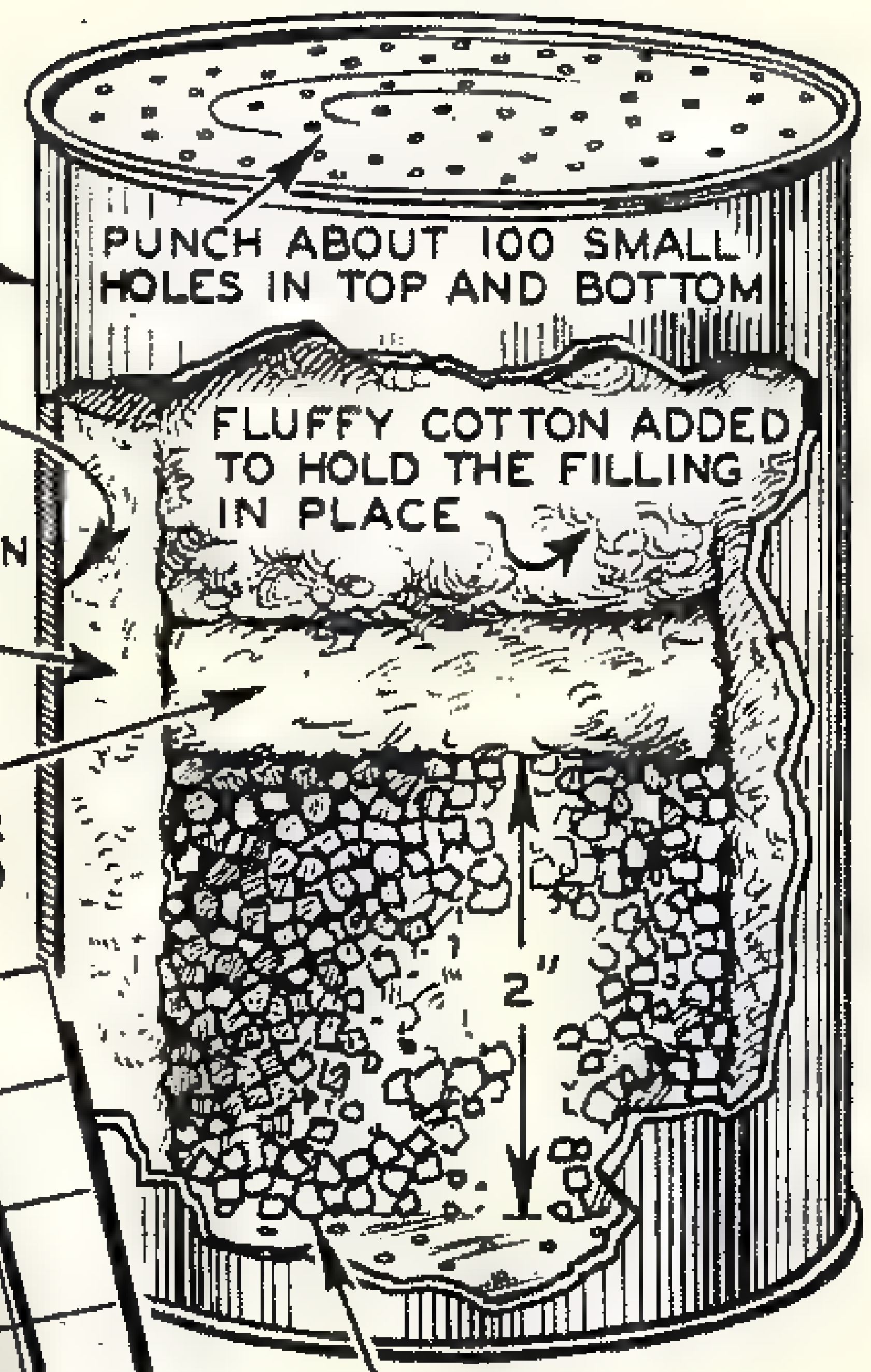


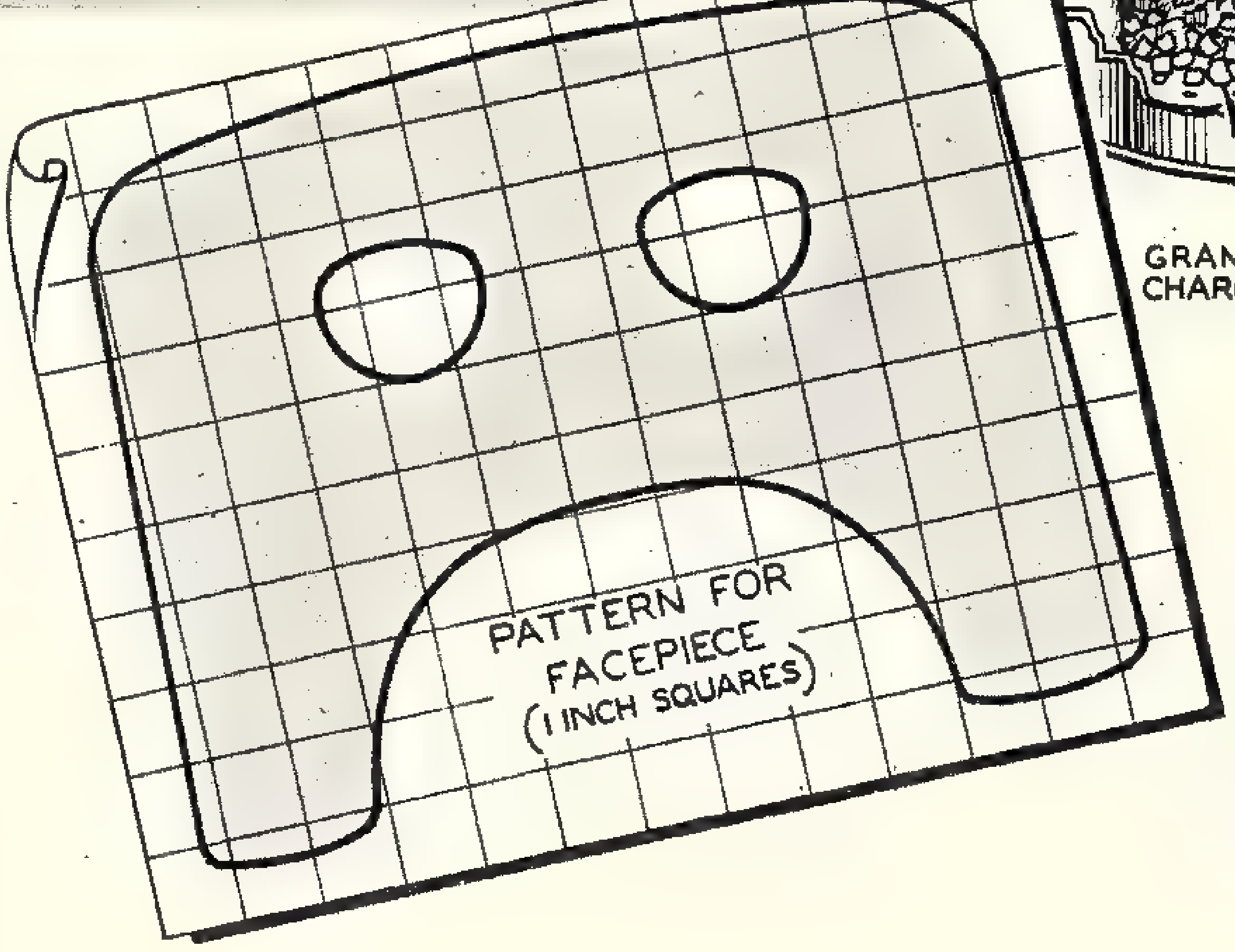
Quickly slipped over the head, the gas mask is ready for immediate use. No annoying breathing tubes are required with this respirator.


1" SOFT LEATHER BAND SEWED AROUND EDGE OF FACEPIECE
SEW AROUND EDGE OF EYEPIECE TO FORM POCKET
APPLY RUBBER CEMENT BETWEEN LAYERS AND CELLULOID BEFORE SEWING
APPLY CEMENT TO SEAM
ABOUT 4" LONG
DOUBLE THICKNESS OF DUCK CLOTH
3/4 ELASTIC BANDS
FACEPIECE CUT FROM SELECTED DUCK (SEE DETAIL OF PATTERN)
ABOUT 5" LONG
CLEAR CELLULOID EYEPIECE
CONTACT SURFACES ARE OILED BEFORE SEWING
LEATHER
CHIN SEAM
CANISTER (SEE DETAIL)
PLACE LAYER OF TAPE AROUND EDGE OF CANNISTER AND FORCE THROUGH FACE-PIECE OPENING
WIRE FACEPIECE TO CANNISTER -COVER WIRING WITH ADHESIVE TAPE
USE FORM SLIGHTLY SMALLER THAN CANNISTER WHEN SEWING CHIN SEAM

This pictorial diagram shows the construction details of Major Barker's breathing mask. The mask itself is made of leather. The breathing unit is an ordinary tin can containing cotton wadding and activated charcoal.

Here is the gas mask before the assembling operation. Celluloid eyepieces are sewed between leather face blanks. A completed mask, ready for use, is shown at upper right.


STANDARD SIZE NO. 3 TIN CAN
PUNCH ABOUT 100 SMALL HOLES IN TOP AND BOTTOM
COAT INSIDE WITH LIQUID GLUE
FLUFFY COTTON ADDED TO HOLD THE FILLING IN PLACE
PLACE LAYER OF ABSORBENT COTTON ALL AROUND INSIDE OF CAN
ADDITIONAL LAYER OF COTTON GLUED IN PLACE
2"
GRANULES OF ACTIVATED CHARCOAL (BUCKSHOT SIZE)
DETAIL OF CANISTER


PATTERN FOR FACEPIECE (1 INCH SQUARES)

Cross-sectional view of the filter canister is illustrated above. A No. 3 tin can with both ends punched with small holes contains the filtering materials. Left—Cut the face blanks from the pattern shown here.

hesive tape is used to bind the seam and render it airtight.

Five pieces of standard elastic ¾ of an inch wide are sewed to the facepiece so that one elastic strap passes over the center of the forehead, one along each temple and one just above the point of the jaw on each side of the face. This spacing of the head harness elastic straps is necessary to give the facepiece a snug fit on the face and to carry the suspended weight of the canister.

A pad about three by four inches in size made of two thicknesses of duck cloth of the same variety as used in the facepieces is now sewed to the ends of the elastic so as to give a tight fit to the facepiece for the average wearer. This is best determined by actual test. However, the temple straps should be about four inches long between the pad and the edge of the facepiece while the chin and forehead straps should be approximately five inches in length.

The canister is made from a standard size No. 3 commercial tin can by perforating the top and bottom each with about one hundred small holes such as produced by a six-penny nail. The can can be cut off about one inch in length and still produce a satisfactory canister which is easier to wear, although the can as purchased is satisfactory.

The inside of the canister is coated with liquid glue or a good grade of adhesive of some other type. A piece of absorbent cotton pad in the form of thin layers, is now cut to fit the can. These two layers are now placed in the can and the edges pressed against the can to secure adhesion.

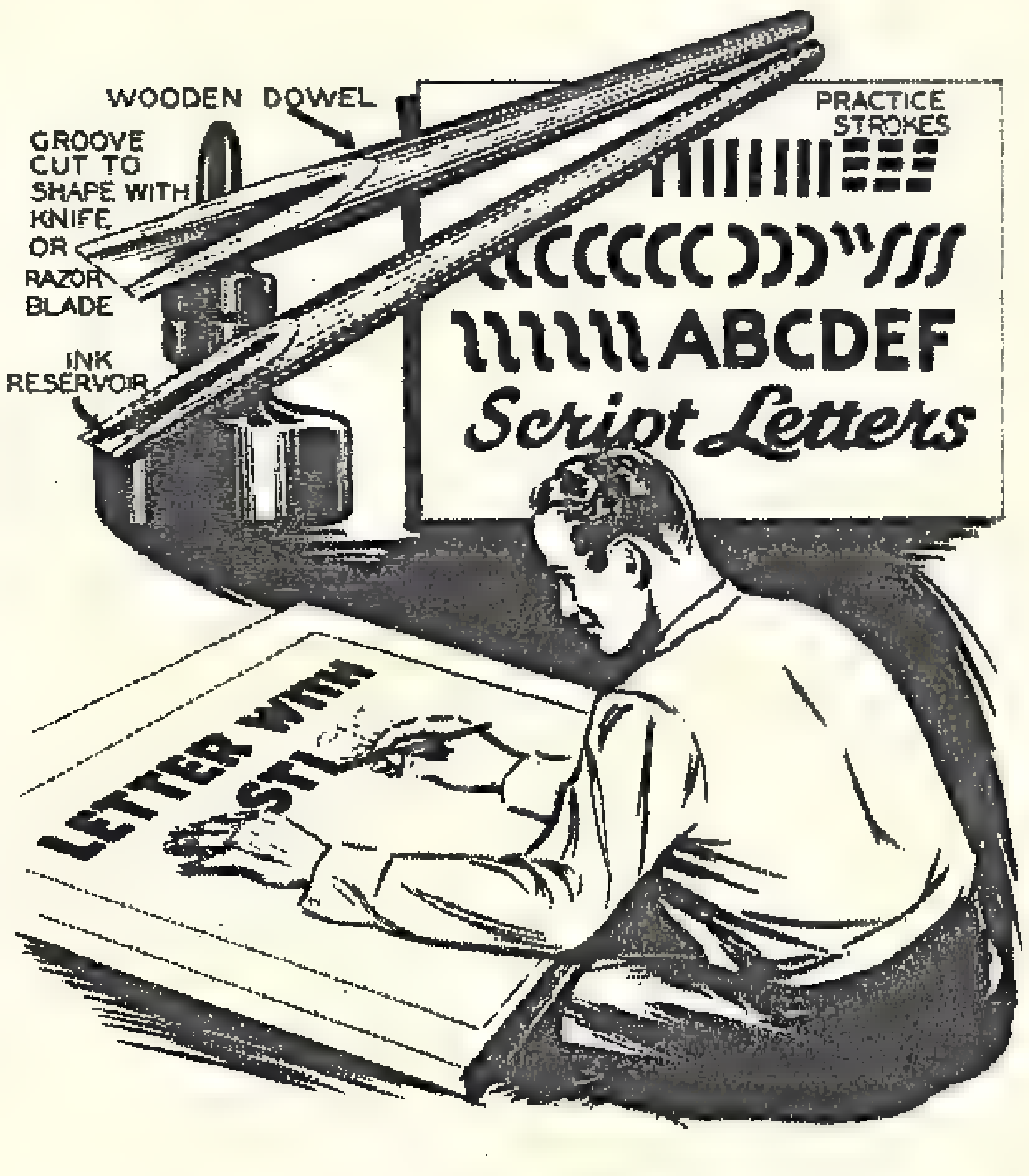
Activated charcoal in granules about the size of buckshot is now filled in the canister to a depth of about two inches, then an additional layer of absorbent cotton cemented in place and ordinary fluffy cotton added on top to hold the filling in place. The top is then rolled into place on the can. This can be done in satisfactory fashion with a pair of small round nosed pliers.

The hole in the facepiece is now sewed with two seams about $\frac{3}{16}$ inch apart. A layer of adhesive tape is fastened around the top of the canister and the canister is slipped through the hole in the facepiece. If the work has been well done a small amount of force is required to push the canister through the facepiece, but there is ample stretch to the facepiece to accommodate the canister. The facepiece after being wired to the canister and the wire covered with adhesive tape is now ready to wear.

The mask outlined above is highly effective in removing dust, smoke and obnoxious gas from the air breathed by wearer.

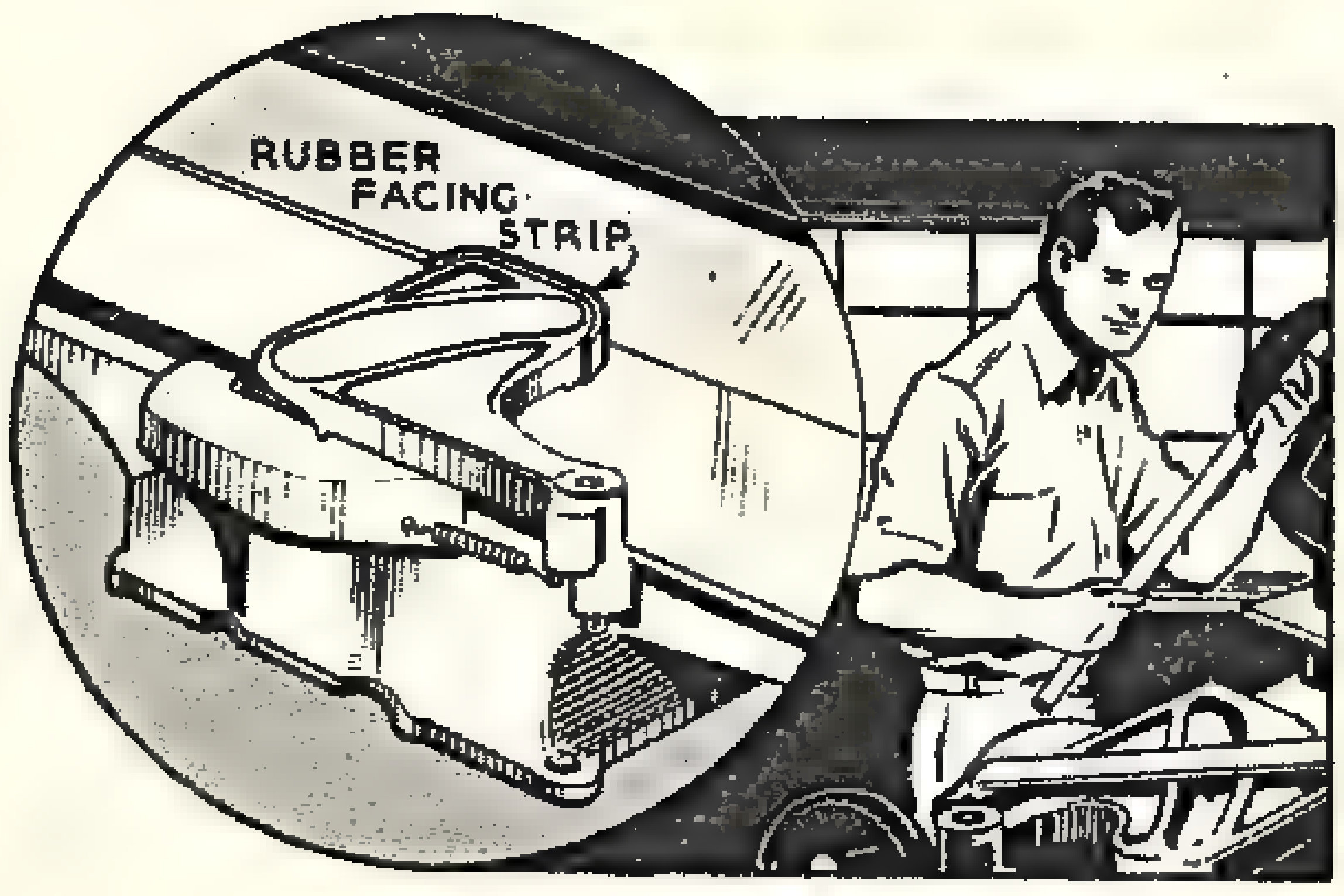
Handikinks For The Workshop

Lettering Pen Made From Skewer


WOODEN DOWEL
GROOVE CUT TO SHAPE WITH KNIFE OR RAZOR BLADE
INK RESERVOIR
PRACTICE STROKES
ABCDEF
Script Letters
LETTER WITH STI

FOR emergency sign lettering when no pen is available an excellent substitute can be carved from a dowel stick or meat skewer. With a sharp knife or razor cut down the end of the stick to form a sharp chisel-like edge; the thinner this point is made the better the pen will write. Next, proceed to make the ink reservoir. This consists of a vee shaped groove cut in one side of the chisel edge. Exercise care in making this cut so that the point is not damaged by the razor cutting through it.

Several pens with points of different widths can be made for various types of lettering work. The pens are used in the same manner as a brush although in lettering with them they respond in much the same manner as a lettering pen.—R. Peterson, Cos Cobb, Conn.

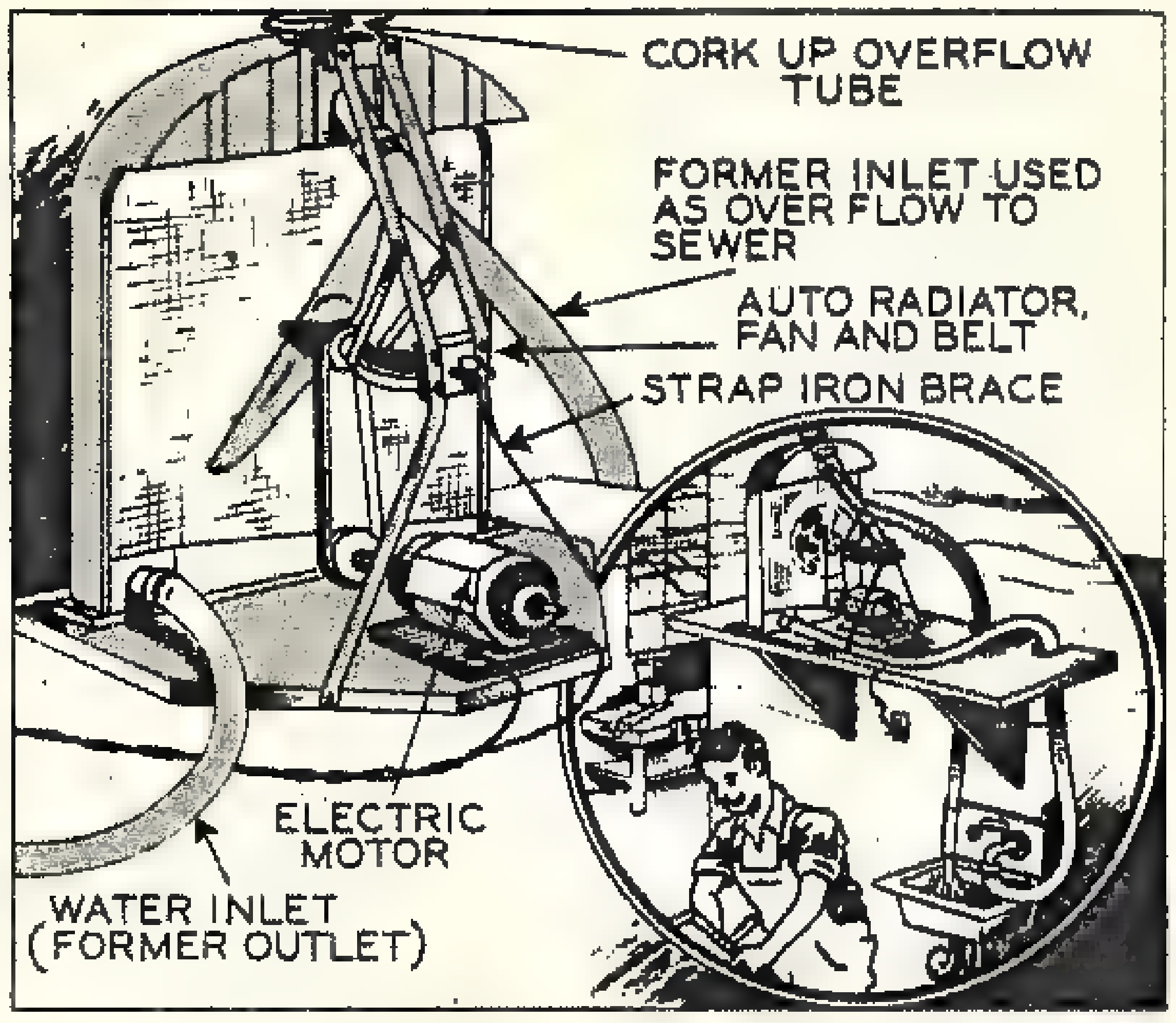

RUBBER FACING STRIP

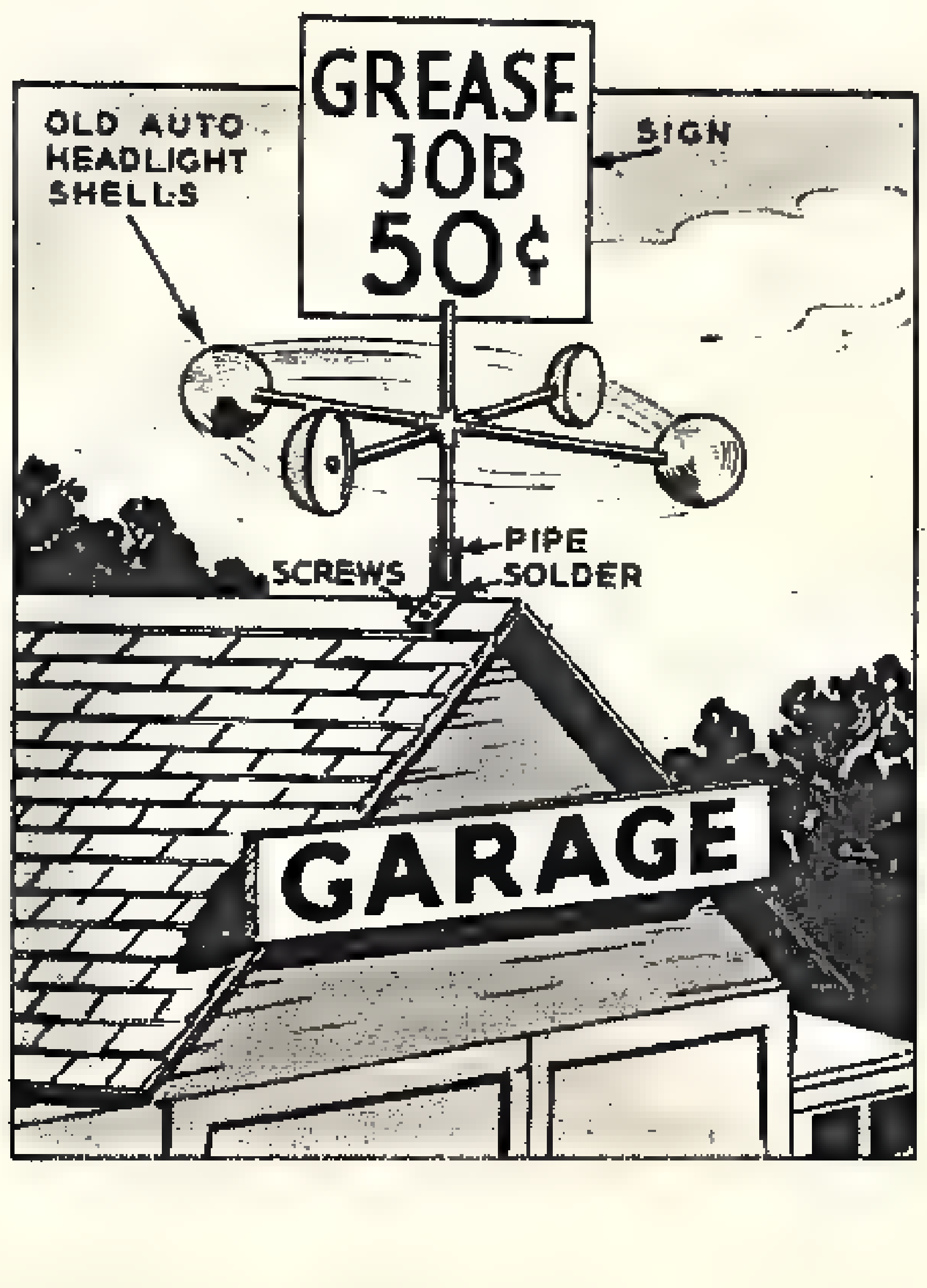
Guard Bumper Deadens Noise

IN MAKING rapid repetition cuts on a jointer the objectionable noise caused by the flap guard constantly banging against the fence can be effectively eliminated by fastening a strip of rubber to the edge of the guard allowing it to extend around the edges. Work can be passed repeatedly through the machine without the usual noise resulting.—Wayne Leckey, Aurora, Ill.

Auto Radiator Forms Air Conditioner

AN AUTOMOBILE radiator and fan can be used in a novel shop air conditioner that will maintain a uniform degree of humidity in the workshop. Mount the radiator on a firm foundation and attach a light electric motor to the fan belt. To the intake cock attach a length of garden hose for connecting to a water faucet. Close the top radiator opening with a plug and fit a hose leading to the sewer drain to the overflow tube. To use the conditioner, turn on the fan and open the water faucet.—P. M. Olinger, Portsmouth, Iowa.

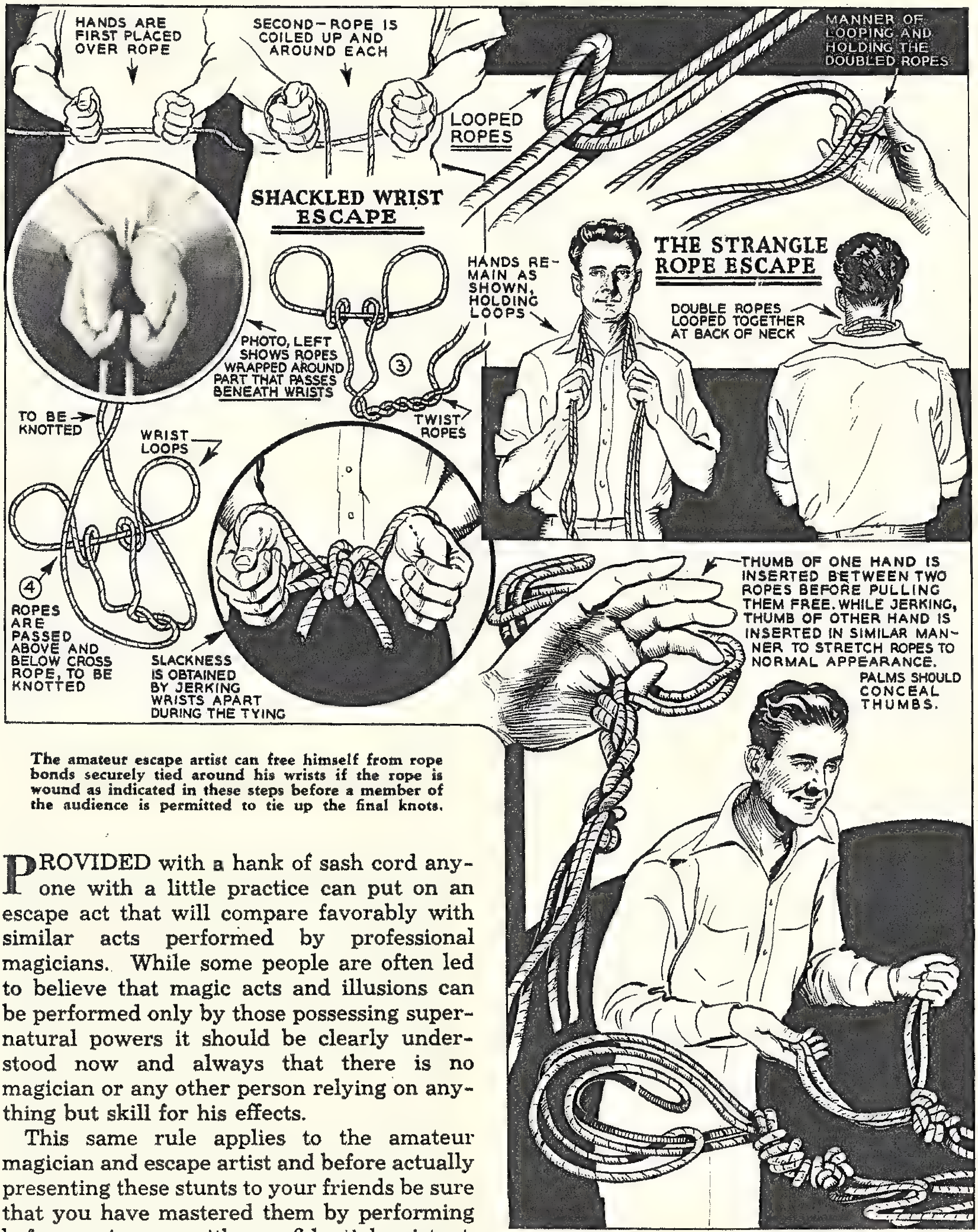

CORK UP OVERFLOW TUBE
FORMER INLET USED AS OVER FLOW TO SEWER
AUTO RADIATOR, FAN AND BELT
STRAP IRON BRACE
ELECTRIC MOTOR
WATER INLET (FORMER OUTLET)


OLD AUTO HEADLIGHT SHELLS
GREASE JOB 50¢
SIGN
SCREWS
PIPE
SOLDER
GARAGE

Headlight Shells Operate Wind Sign

FOR the ambitious garage repair man this novel wind sign offers many possibilities for attracting new business. From wrecked cars salvage four headlight shells and weld or solder them to light tubing or lengths of broom handle. Attach them to an upright post fitted loosely in a flange mounted on the roof of the garage. A suitable sign is painted on sheet metal and fastened to the top of the upright member in the manner illustrated. Do not make the sign too large or wind resistance may prevent its revolving. Grease both the upright post or pipe and the flange with graphite or a similar lubricant.—Robert Poulson, Los Angeles, Calif.

ROPE STUNTS FOR THE


HANDS ARE FIRST PLACED OVER ROPE
SECOND–ROPE IS COILED UP AND AROUND EACH
LOOPED ROPES
MANNER OF LOOPING AND HOLDING THE DOUBLED ROPES
SHACKLED WRIST ESCAPE
PHOTO, LEFT SHOWS ROPES WRAPPED AROUND PART THAT PASSES BENEATH WRISTS
③
TWIST ROPES
TO BE KNOTTED
WRIST LOOPS
④
ROPES ARE PASSED ABOVE AND BELOW CROSS ROPE, TO BE KNOTTED
SLACKNESS IS OBTAINED BY JERKING WRISTS APART DURING THE TYING
THE STRANGLE ROPE ESCAPE
HANDS REMAIN AS SHOWN, HOLDING LOOPS
DOUBLE ROPES LOOPED TOGETHER AT BACK OF NECK
THUMB OF ONE HAND IS INSERTED BETWEEN TWO ROPES BEFORE PULLING THEM FREE. WHILE JERKING, THUMB OF OTHER HAND IS INSERTED IN SIMILAR MANNER TO STRETCH ROPES TO NORMAL APPEARANCE.
PALMS SHOULD CONCEAL THUMBS.

The amateur escape artist can free himself from rope bonds securely tied around his wrists if the rope is wound as indicated in these steps before a member of the audience is permitted to tie up the final knots.

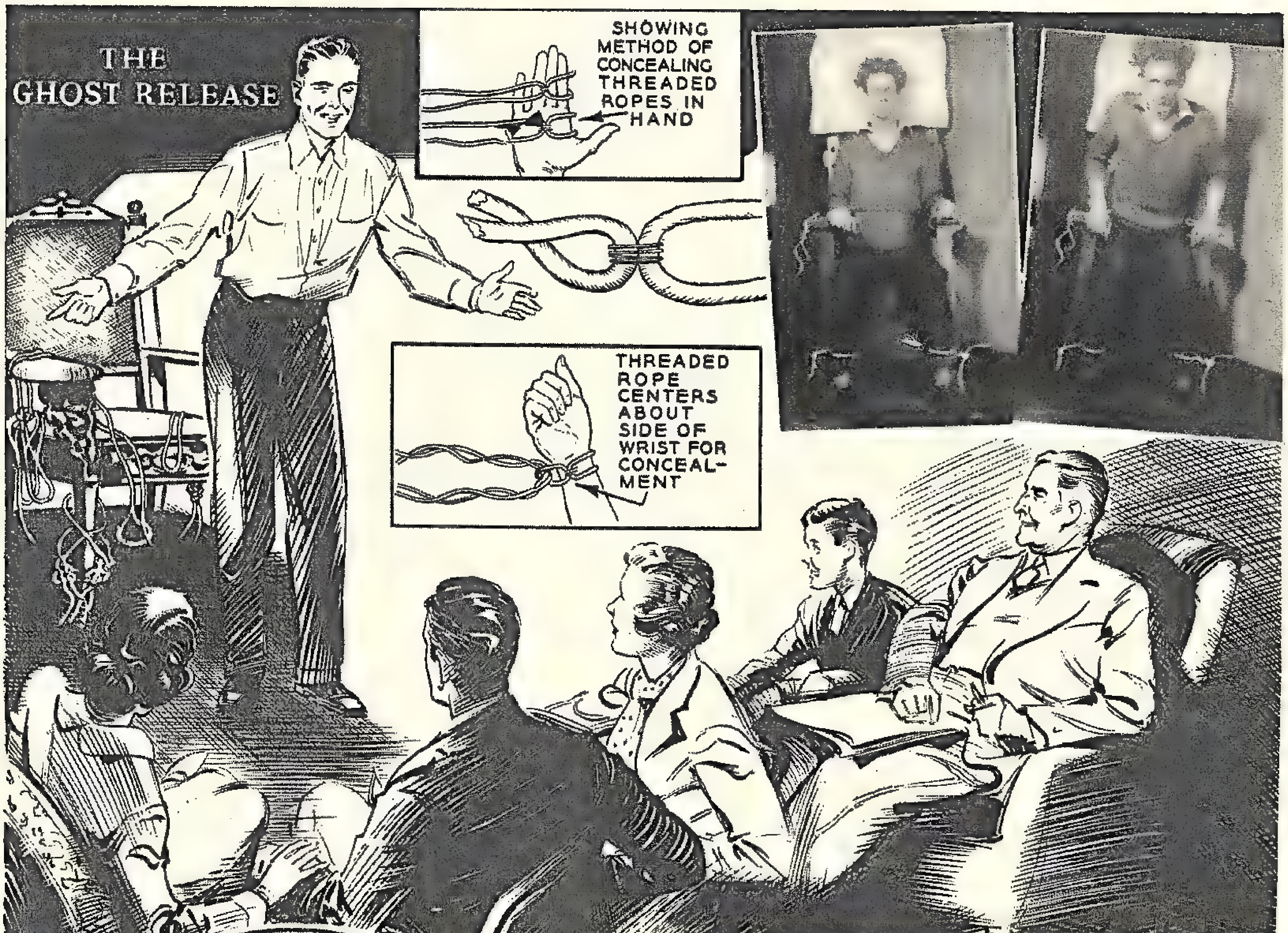
Although a double rope around the performer's neck apparently passes completely through it, when the ends are pulled by spectators, the rope actually is a double loop locked in the center with thumb and forefinger.

PROVIDED with a hank of sash cord anyone with a little practice can put on an escape act that will compare favorably with similar acts performed by professional magicians. While some people are often led to believe that magic acts and illusions can be performed only by those possessing supernatural powers it should be clearly understood now and always that there is no magician or any other person relying on anything but skill for his effects.

This same rule applies to the amateur magician and escape artist and before actually presenting these stunts to your friends be sure that you have mastered them by performing before a mirror or with a confidential assistant.

A very good stunt for beginning an escape presentation is the "Shackled Wrist Escape." Offer a spectator a length of sash cord and instruct him to tie up your hands by wrapping it around your wrists and bringing it

AMATEUR "Escape" ARTIST


THE GHOST RELEASE
SHOWING METHOD OF CONCEALING THREADED ROPES IN HAND
THREADED ROPE CENTERS ABOUT SIDE OF WRIST FOR CONCEAL- MENT

While apparently bound securely to a chair with doubled rope escape is simple since the ropes are secretly joined together with thread. The joints are concealed from view so that detection by the spectators is almost impossible.

THE WRIST SLIP

Although members of the audience are allowed to bind the performer with a one hundred foot coil of sash rope the escape, which involves no trickery, is simple. The performer depends upon human nature for its success.

down between the hands then wrapping it around the bottom cord as described in the accompanying illustrations. After doing this, permit the spectator to knot the cords as often as he likes so long as he is satisfied that you are securely bound. Now turn to the audience and announce that you will free your bonds before they can count to ten. Saying this, turn your back to the audience and jerk your wrists. The cords will now be sufficiently loose so that you can free your hands in a moment. Like many escape stunts, this one depends upon the method used in tying the knot.

"The Strangle Rope Escape" is one of the most effective rope tricks ever devised and unquestionably the simplest to perform. Here the performer makes it appear that after he has been securely bound around the neck with a double rope he allows two spectators to grasp each end of the double rope and

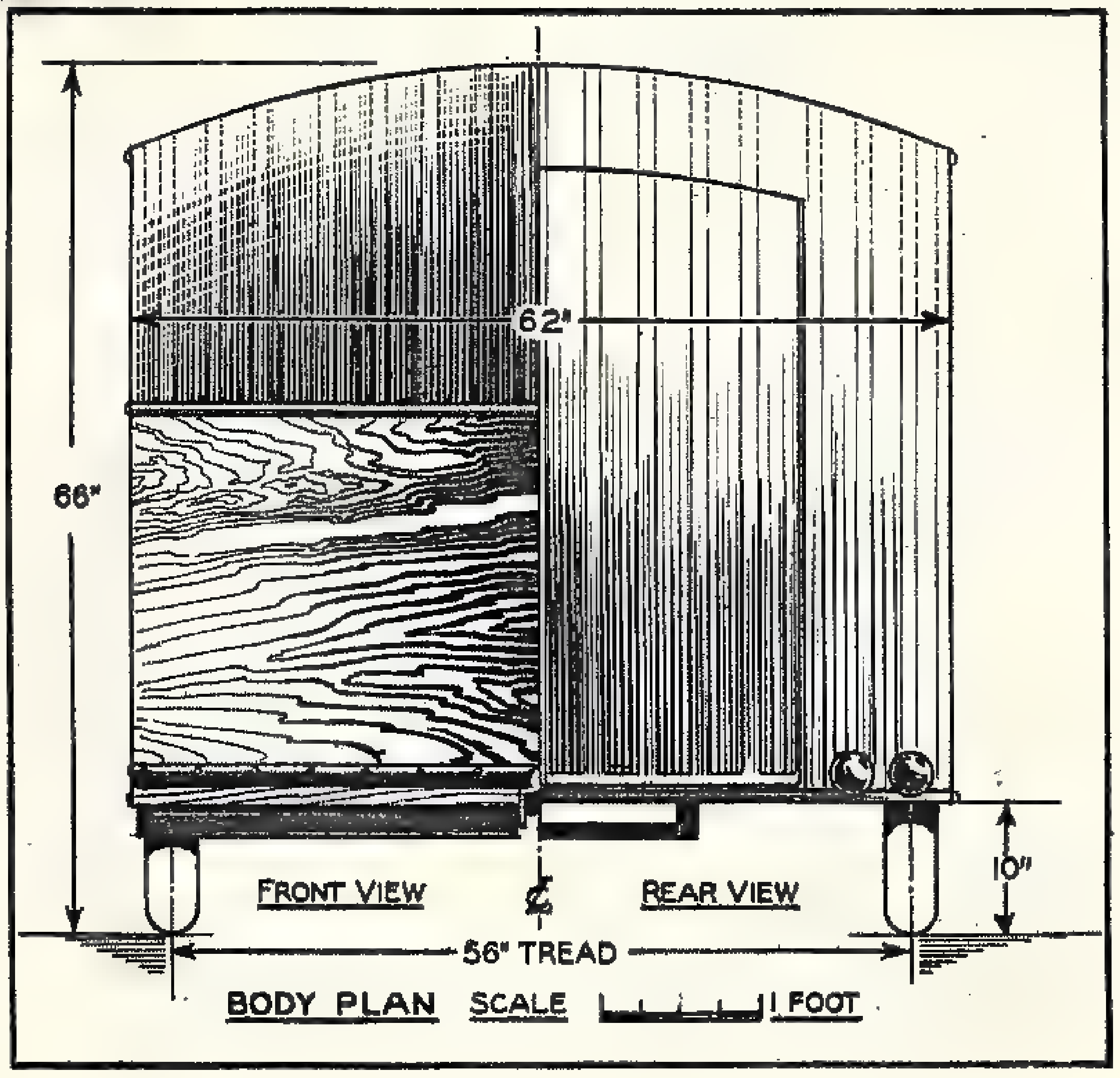
[*Continued on page* 126]

"Runlite"—a Compact

Designed for the person who prefers a light portable shelter to a more commodious trailer, this lightweight streamlined modern vehicle is noteworthy for its low cost and safety at high speeds.

65 692
CALIFORNIA 36

Looking into the "cabin" through the open galley hatch. "Runlite" has ample space for two full length spring mattresses. Below—Body plan dimensioned to scale.



TRAILER owners incline to divide into two schools of thought; one group wanting the kind of trailer in which they can, if necessary, live permanently—the other preferring something rather lighter and more suitable for use on extended trips, such as vacations, where economy and high cruising speeds are of major importance. *Runlite* has been designed for the latter group.

By placing the wheels quite far aft it has been possible to make this an underslung job, making it directly possible to combine really effective streamlining with marked stability. The weight of the whole trailer being so low, much of the weight is carried by the tongue, a matter of no particular concern in the case of *Runlite* since it is normal for a load of 150 or even 200 pounds to be distributed on the hitch of all trailers.

Runlite can actually be towed at a 60 m. p. h. gait without straining any good light car.

Straightforward methods of construction are used in this design. There is practically no welding and absolutely no special machine work to be done. The roof, which at first glance may seem a problem, is actually simpler to construct than that of the average trailer.

Another word before starting in on the actual construction work: Comparison will reveal some slight difference between photos and drawings in this article. It is quite unimportant and, as far as that goes, the curves, the width and the over all height may be modified to suit the builder's requirements.

Start with the frame. What few welded joints you will have to make are encountered here. If you lack the proper equipment or experience have the welding done by an expert. The cost will be low and the sense of security a good deal greater.

Use an old Model T Ford frame. At your local junk yard these should be anywhere from 75 cents to $2.75. Using a hacksaw, cut out a 13½" length on each side 7" from the front end. Saw out the channels to fit and weld at right angles so that the frame now has a 13½" kick-up as shown in the drawings.

Traveling Bedroom

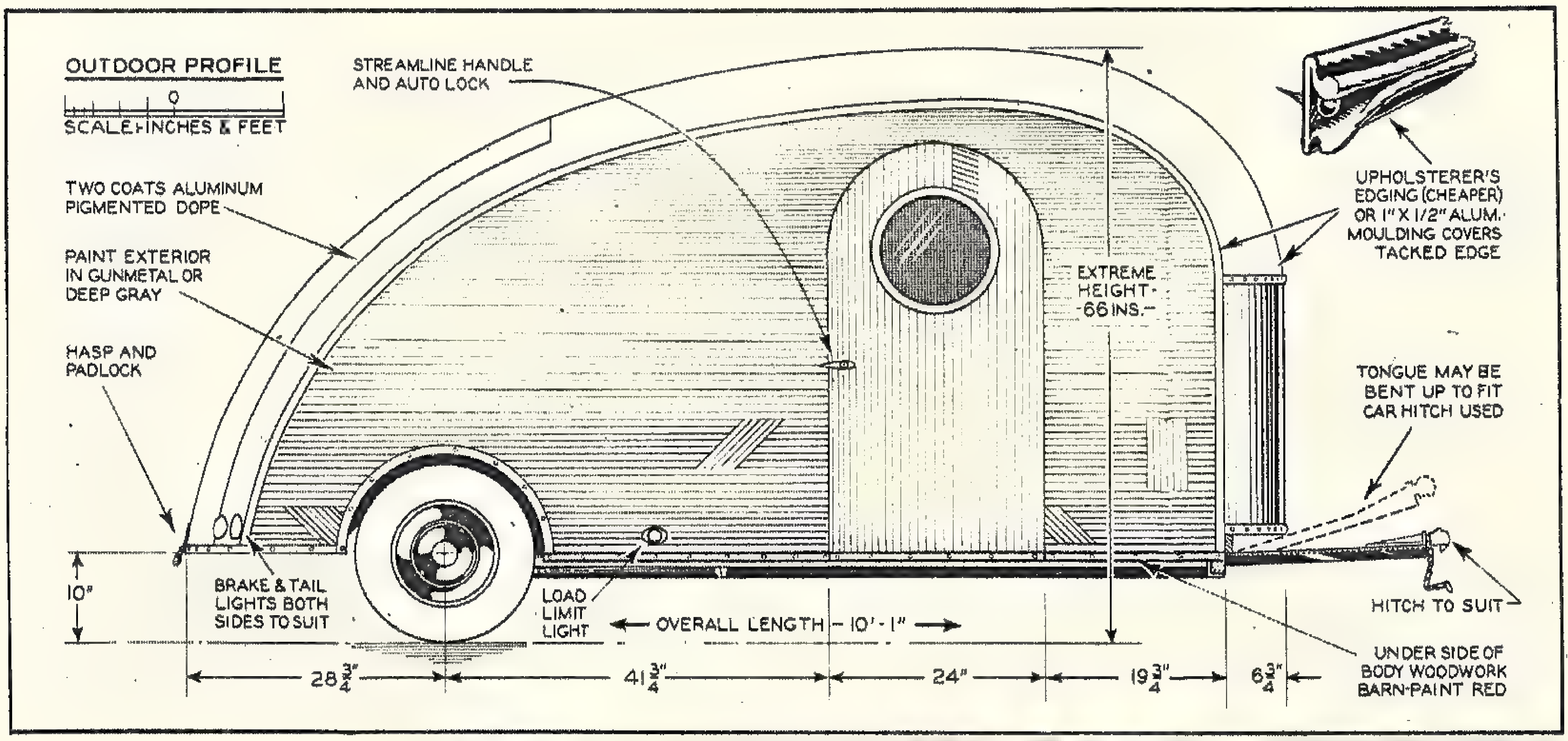
An angle iron tie piece 1¼"x1¼"x$\frac{3}{16}$" is welded across the bottom of the frame as shown in the perspective drawing of the frame. At the rear end the rear face of the spring perch is cut off with torch or hacksaw. Into the perch a 2"x4", preferably of white oak, is carefully fitted. This beam should be the full width of the body and its obvious purpose is clearly shown in the drawings. Two more lengths of Ford T frame are used for the trailer tongue and the cross-member to which it is anchored. Joints here may be either by welding or bolting. It will be necessary to cut out the filler piece for the tongue—which is bolted securely to the spring perch as well as to the channel cross piece.

Bolt or weld a standard hitch to end of tongue. The height of hitch can be adjusted by heating tongue and bending upwards.

Only four leaves of the front spring are used. A shim is put in under the perch clip bottom to compensate for the leaves removed. Second hand Model T steering tie rods are used in the manner shown for radius rods. The ball and socket fixtures for the frame end of the rods are from regular Ford radius rods. They should be welded on. The axle ends of the rods may be attached either by flattening and bolting direct to the wing spring perches, as shown, or drilled clear through the axle and bolted either side. This latter method provides an easy method of aligning the wheels.

20"x4" wheels from a motorcycle pick-up trailer are used. Such wheels fit Model T Ford spindles without change. They cost about $4.00 each and the tires about the same.

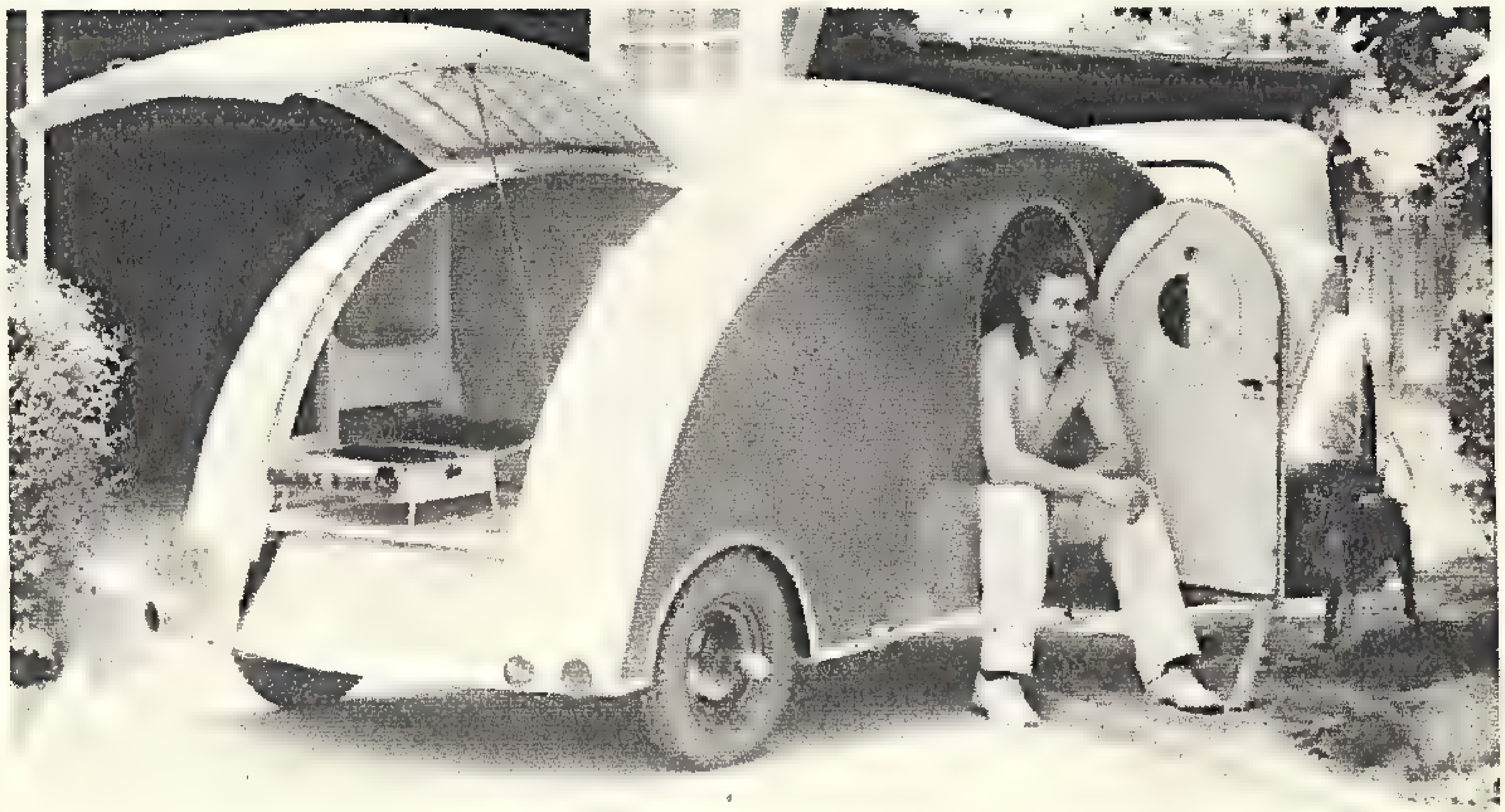
The completed frame, ball hitch, radius rods.


OUTDOOR PROFILE
0
SCALE-INCHES & FEET
STREAMLINE HANDLE AND AUTO LOCK
TWO COATS ALUMINUM PIGMENTED DOPE
PAINT EXTERIOR IN GUNMETAL OR DEEP GRAY
HASP AND PADLOCK
UPHOLSTERER'S EDGING (CHEAPER) OR 1" X 1/2" ALUM. MOULDING COVERS TACKED EDGE
EXTREME HEIGHT-66 INS.
TONGUE MAY BE BENT UP TO FIT CAR HITCH USED
10"
BRAKE & TAIL LIGHTS BOTH SIDES TO SUIT
LOAD LIMIT LIGHT
OVERALL LENGTH - 10'-1"
HITCH TO SUIT
UNDER SIDE OF BODY WOODWORK BARN-PAINT RED
28¾"
41¾"
24"
19¾"
6¾"

The profile lines of "Runlite," accurately scaled above, convey immediately grace and speed of the design. While the basic design should not be tampered with, headroom and width can be increased, if builder wishes, without harming the appearance of fast stepping trailerette.

●

Photograph here shows to advantage the charm small trailers of this type hold. Note excellent proportions of this vast pocket trailer—its very low-hung position, practical cooking facilities, obvious roominess. Hardly higher than small car, it sleeps and feeds two adults!



wheels and tires should not cost over $20.00 with welding included.

The steering tie rod is cut in two, the ends flattened and bolted to the axle as shown. This completes the entire chassis and the rest of the job is straight woodwork (with a little tin work here and there).

Build the floor as a foundation for the body. Second grade Oregon pine flooring, tongued and grooved, is bolted to the chassis frame starting at the rear end and working toward the towing end of the trailer. This flooring should be wide enough to finish 61½″ wide after trimming the sides for straightness. Rabbet the first plank laid to hold the ¼″ bulkhead as shown and cut out where necessary for the spring perch at the towing end. This cut out is later covered with tin—see drawings. Lay a straightedge along the sides and saw off flush.

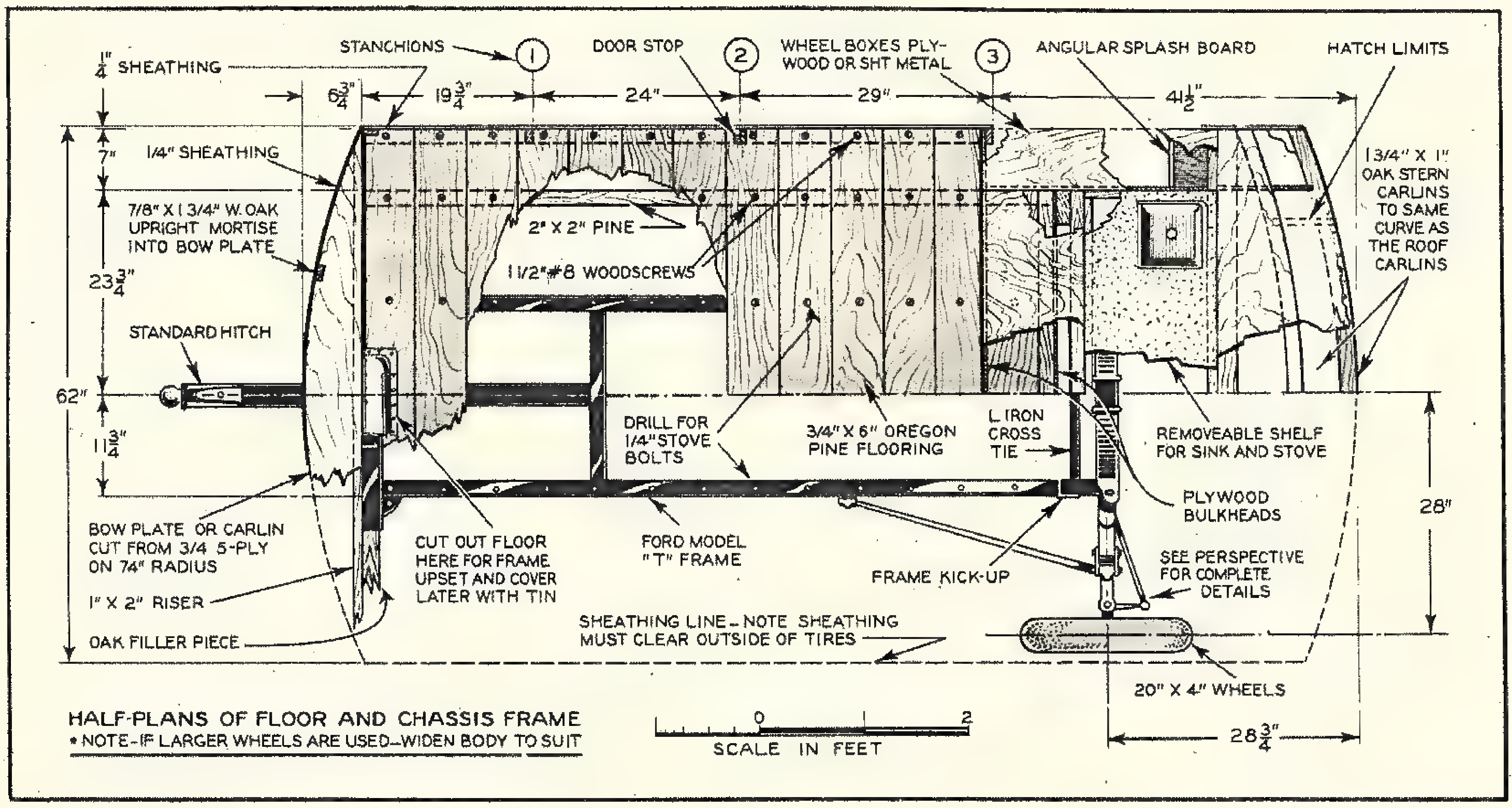
Next screw in the 1″x2″ and 2″x2″ stringers to the underside of the flooring as shown in the drawings, allowing the ends to project several inches beyond the floor at the rear. Stanchions No. 3 and the 2″x4″ uprights are mortised into these projecting ends and the stringers trimmed off flush as shown in the detail sketches.

The stanchion framing can now be completed. The heels of the stanchions are boxed into the floor and bolted into the 1″x2″ edge or side piece. With the main stanchions in the ¼″ plywood or hard Celotex bulkheads can be installed and the boxes for the wheels built up. Framing for cupboards, water tank, sink and so forth is left until the body has been built.

Cut out the crown carlins and also the bow plate. Detail drawings give the dimensions and it will be noted that 11 carlins in all are required. Some of these are used for the roof —three being bolted to the main stanchions already installed. The remaining carlins are required for bow and stern, and for the hatch. Install the bow plate in the manner shown. It is cut on a 72″ radius, is ¾″ thick and 6¾″ deep. It is screwed to the riser strip which in turn is bolted to the filler piece in the spring perch.

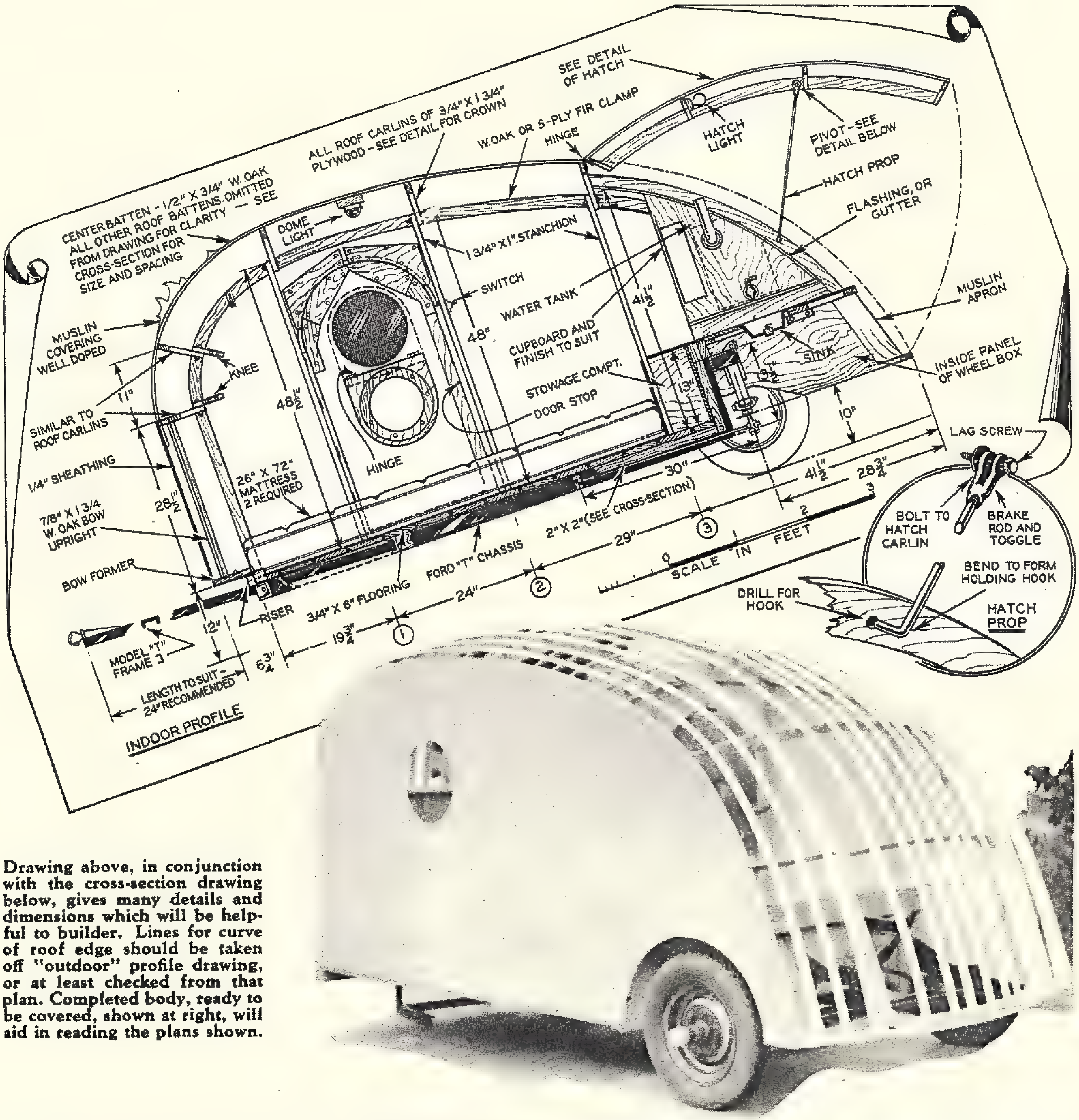
The side clamps or roof strips can now be sawed to shape and mortised into the tops of the stanchions as shown. They may be lightly screwed until the outer sheathing is applied. This sheathing, of fir plywood, ¼″ thick, or hard Celotex, is screwed directly to the stanchions, floor edges and 1″x2″ outer strips. The carlins at front and back of the trailer are put in with knees as shown. Do not apply the sheathing to the front end of the trailer until the roof battens have been bent in. If these prove stiff, soaking for half a day under the lawn sprinkler will render them pliable. They are fastened over the carlins without notches except where they bend into the front, or bow cabin. They are notched flush into this former. Use light screws to secure the roof battens.

The lift-up cover over the galley, called a hatch in the drawings, is built up in the manner shown. The longitudinal carlins are cut to the same sweep as the roof from ¾″


¼″ SHEATHING
STANCHIONS
①
DOOR STOP
②
WHEEL BOXES PLYWOOD OR SHT METAL
③
ANGULAR SPLASH BOARD
HATCH LIMITS
6¾″
19¾″
24″
29″
41½″
7″
1/4″ SHEATHING
7/8″ X 1 3/4″ W. OAK UPRIGHT MORTISE INTO BOW PLATE
23¾″
2″ X 2″ PINE
1 1/2″ #8 WOODSCREWS
13/4″ X 1″ OAK STERN CARLINS TO SAME CURVE AS THE ROOF CARLINS
STANDARD HITCH
62″
11¾″
DRILL FOR 1/4″ STOVE BOLTS
3/4″ X 6″ OREGON PINE FLOORING
L IRON CROSS TIE
REMOVEABLE SHELF FOR SINK AND STOVE
PLYWOOD BULKHEADS
28″
BOW PLATE OR CARLIN CUT FROM 3/4 5-PLY ON 74″ RADIUS
CUT OUT FLOOR HERE FOR FRAME UPSET AND COVER LATER WITH TIN
FORD MODEL "T" FRAME
FRAME KICK-UP
SEE PERSPECTIVE FOR COMPLETE DETAILS
1″ X 2″ RISER
SHEATHING LINE – NOTE SHEATHING MUST CLEAR OUTSIDE OF TIRES
OAK FILLER PIECE
20″ X 4″ WHEELS
0
2
SCALE IN FEET
28¾″

HALF-PLANS OF FLOOR AND CHASSIS FRAME
* NOTE—IF LARGER WHEELS ARE USED—WIDEN BODY TO SUIT

These plan views of the trailer, chassis and floor frame, used in conjunction with indoor profile plans on the following page (and the sectional views of the body), should be studied carefully.

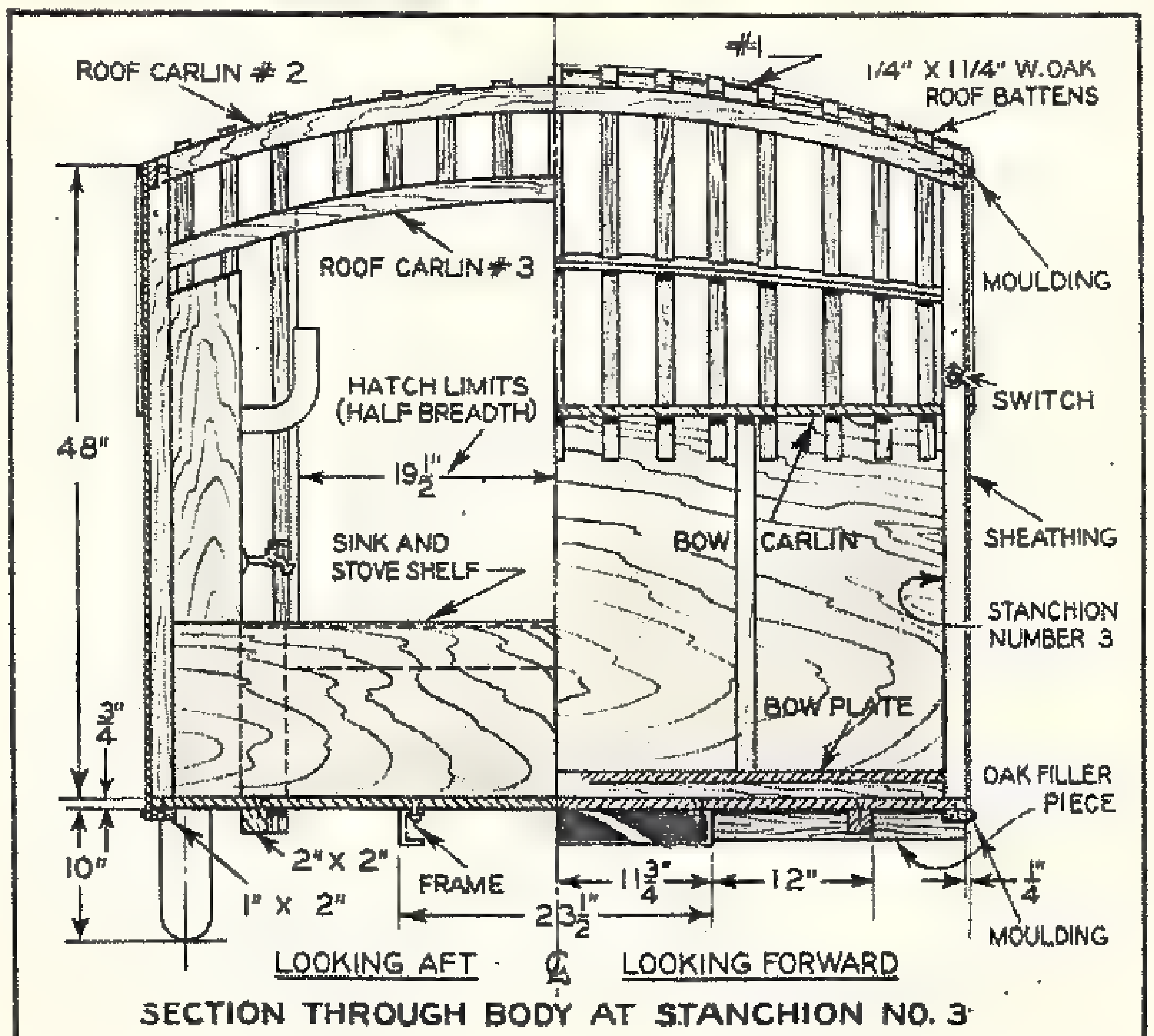

SEE DETAIL OF HATCH
ALL ROOF CARLINS OF 3/4" X 1 3/4" PLYWOOD - SEE DETAIL FOR CROWN
W. OAK OR 5-PLY FIR CLAMP
HINGE
HATCH LIGHT
PIVOT - SEE DETAIL BELOW
HATCH PROP
FLASHING, OR GUTTER
CENTER BATTEN - 1/2" X 3/4" W. OAK ALL OTHER ROOF BATTENS OMITTED FROM DRAWING FOR CLARITY — SEE CROSS-SECTION FOR SIZE AND SPACING
DOME LIGHT
1 3/4" X 1" STANCHION
SWITCH
WATER TANK
CUPBOARD AND FINISH TO SUIT
STOWAGE COMPT.
DOOR STOP
MUSLIN APRON
SINK
INSIDE PANEL OF WHEEL BOX
MUSLIN COVERING WELL DOPED
KNEE
SIMILAR TO ROOF CARLINS
1/4" SHEATHING
7/8" X 1 3/4 W. OAK BOW UPRIGHT
BOW FORMER
26" X 72" MATTRESS 2 REQUIRED
HINGE
48"
48½"
41½"
13"
13½"
11"
28½"
10"
30"
41½"
28¾"
LAG SCREW
BOLT TO HATCH CARLIN
BRAKE ROD AND TOGGLE
BEND TO FORM HOLDING HOOK
DRILL FOR HOOK
HATCH PROP
2" X 2" (SEE CROSS-SECTION)
③
29"
FORD "T" CHASSIS
②
24"
3/4" X 6" FLOORING
①
19¾"
RISER
12"
MODEL "T" FRAME
6¾"
LENGTH TO SUIT - 24" RECOMMENDED
0 1 2 3
SCALE IN FEET
INDOOR PROFILE

Drawing above, in conjunction with the cross-section drawing below, gives many details and dimensions which will be helpful to builder. Lines for curve of roof edge should be taken off "outdoor" profile drawing, or at least checked from that plan. Completed body, ready to be covered, shown at right, will aid in reading the plans shown.

plywood. Cut out four of these carlins, two of them being permanently attached to the stern portion of the body frame as shown. The other two of course form the sides of the hatch itself. A tin gutter should be hammered out and fitted along the edges of the hatch opening in the manner shown.

Attach the sheathing to the front end now. It will bend to the slight curve quite easily.

The door is clearly indicated. Lock arrangement and so on is left to the builder though a streamlined blind door handle was used on the trailer pictured. A 12" porthole is cut into the door and another one exactly opposite in the sheathing on the other side. A screen is secured to the outside of each port and inside they are furnished with hinged windows as clearly shown. Glass or

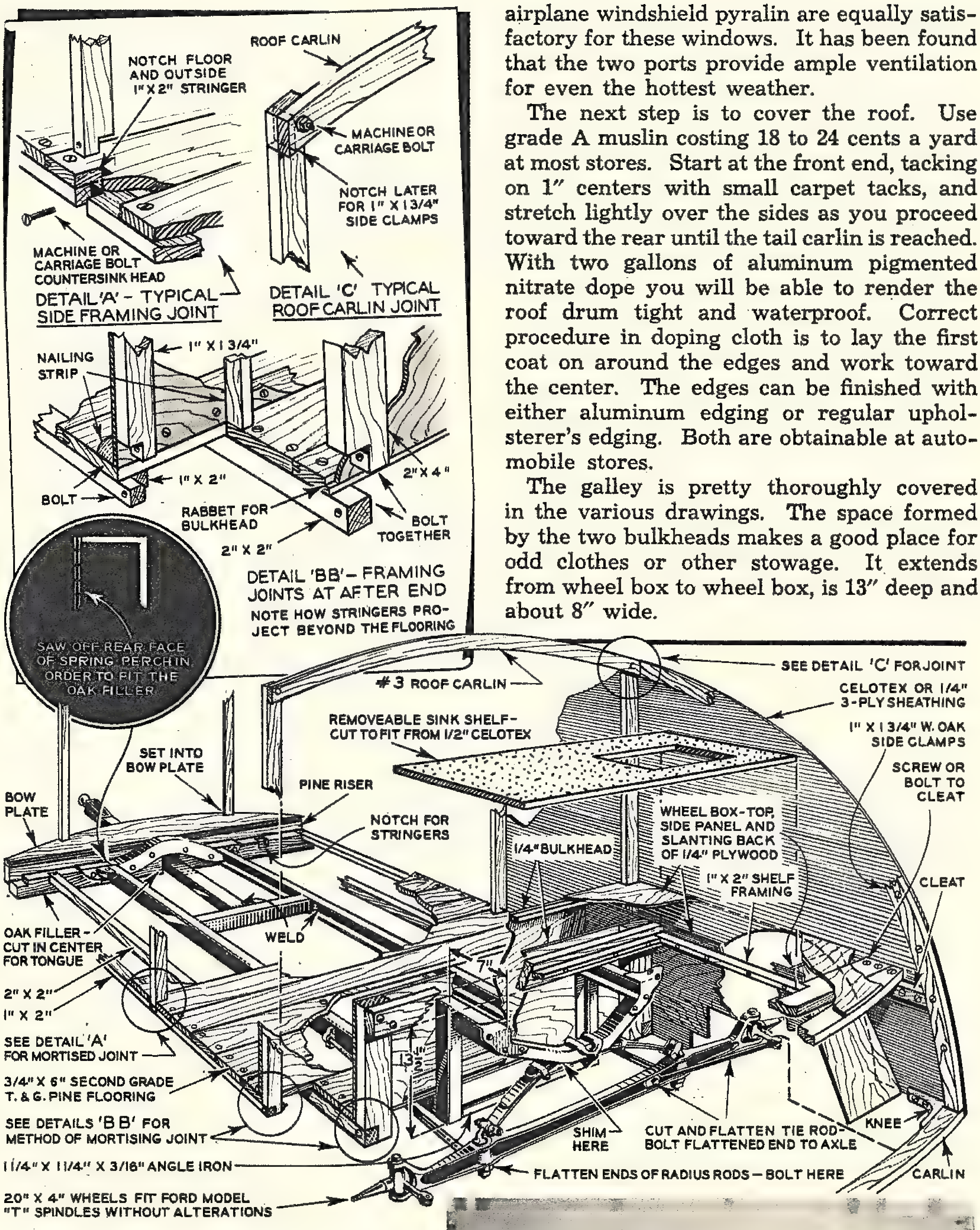

ROOF CARLIN # 2
#1
1/4" X 1 1/4" W. OAK ROOF BATTENS
ROOF CARLIN # 3
MOULDING
HATCH LIMITS (HALF BREADTH)
SWITCH
48"
19½"
SINK AND STOVE SHELF
BOW
CARLIN
SHEATHING
STANCHION NUMBER 3
¾"
BOW PLATE
OAK FILLER PIECE
10"
2" X 2"
1" X 2"
FRAME
11¾"
12"
23½"
¼"
MOULDING
LOOKING AFT
℄
LOOKING FORWARD

SECTION THROUGH BODY AT STANCHION NO. 3

airplane windshield pyralin are equally satisfactory for these windows. It has been found that the two ports provide ample ventilation for even the hottest weather.

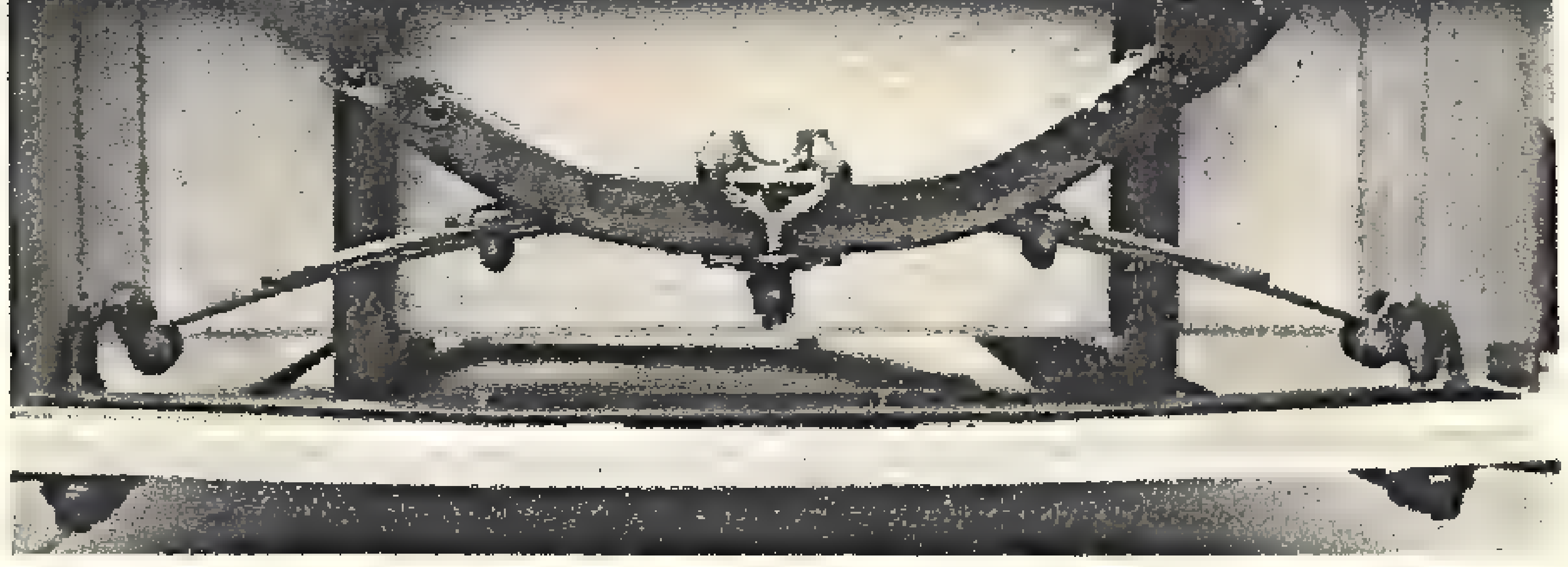
The next step is to cover the roof. Use grade A muslin costing 18 to 24 cents a yard at most stores. Start at the front end, tacking on 1" centers with small carpet tacks, and stretch lightly over the sides as you proceed toward the rear until the tail carlin is reached. With two gallons of aluminum pigmented nitrate dope you will be able to render the roof drum tight and waterproof. Correct procedure in doping cloth is to lay the first coat on around the edges and work toward the center. The edges can be finished with either aluminum edging or regular upholsterer's edging. Both are obtainable at automobile stores.

The galley is pretty thoroughly covered in the various drawings. The space formed by the two bulkheads makes a good place for odd clothes or other stowage. It extends from wheel box to wheel box, is 13" deep and about 8" wide.


NOTCH FLOOR AND OUTSIDE 1" X 2" STRINGER
MACHINE OR CARRIAGE BOLT COUNTERSINK HEAD
DETAIL 'A' - TYPICAL SIDE FRAMING JOINT
ROOF CARLIN
MACHINE OR CARRIAGE BOLT
NOTCH LATER FOR 1" X 1 3/4" SIDE CLAMPS
DETAIL 'C' TYPICAL ROOF CARLIN JOINT
NAILING STRIP
1" X 1 3/4"
1" X 2"
BOLT
RABBET FOR BULKHEAD
2" X 2"
2" X 4"
BOLT TOGETHER
DETAIL 'BB' - FRAMING JOINTS AT AFTER END
NOTE HOW STRINGERS PROJECT BEYOND THE FLOORING
SAW OFF REAR FACE OF SPRING PERCH IN ORDER TO FIT THE OAK FILLER
#3 ROOF CARLIN
SEE DETAIL 'C' FOR JOINT
CELOTEX OR 1/4" 3-PLY SHEATHING
1" X 1 3/4" W. OAK SIDE CLAMPS
SCREW OR BOLT TO CLEAT
CLEAT
REMOVEABLE SINK SHELF-CUT TO FIT FROM 1/2" CELOTEX
SET INTO BOW PLATE
BOW PLATE
PINE RISER
NOTCH FOR STRINGERS
1/4" BULKHEAD
WHEEL BOX-TOP, SIDE PANEL AND SLANTING BACK OF 1/4" PLYWOOD
1" X 2" SHELF FRAMING
OAK FILLER-CUT IN CENTER FOR TONGUE
WELD
7"
2" X 2"
1" X 2"
SEE DETAIL 'A' FOR MORTISED JOINT
3/4" X 6" SECOND GRADE T. & G. PINE FLOORING
13½"
SEE DETAILS 'B B' FOR METHOD OF MORTISING JOINT
1 1/4" X 1 1/4" X 3/16" ANGLE IRON
SHIM HERE
CUT AND FLATTEN TIE ROD-BOLT FLATTENED END TO AXLE
KNEE
FLATTEN ENDS OF RADIUS RODS - BOLT HERE
CARLIN
20" X 4" WHEELS FIT FORD MODEL "T" SPINDLES WITHOUT ALTERATIONS

GENERAL PERSPECTIVE CONSTRUCTION DRAWING SHOWING FLOORING AND OTHER FRAMING DETAIL

This important construction drawing is not in scale but is arranged to show the general detail of the chassis, the flooring and—above—the principal stanchion joints. Note how the frame is "kicked up" in order to undersling the trailer. Note also the framing about the wheel boxes and the installation of the bulkheads and the bow plate. Study with the photo at right.

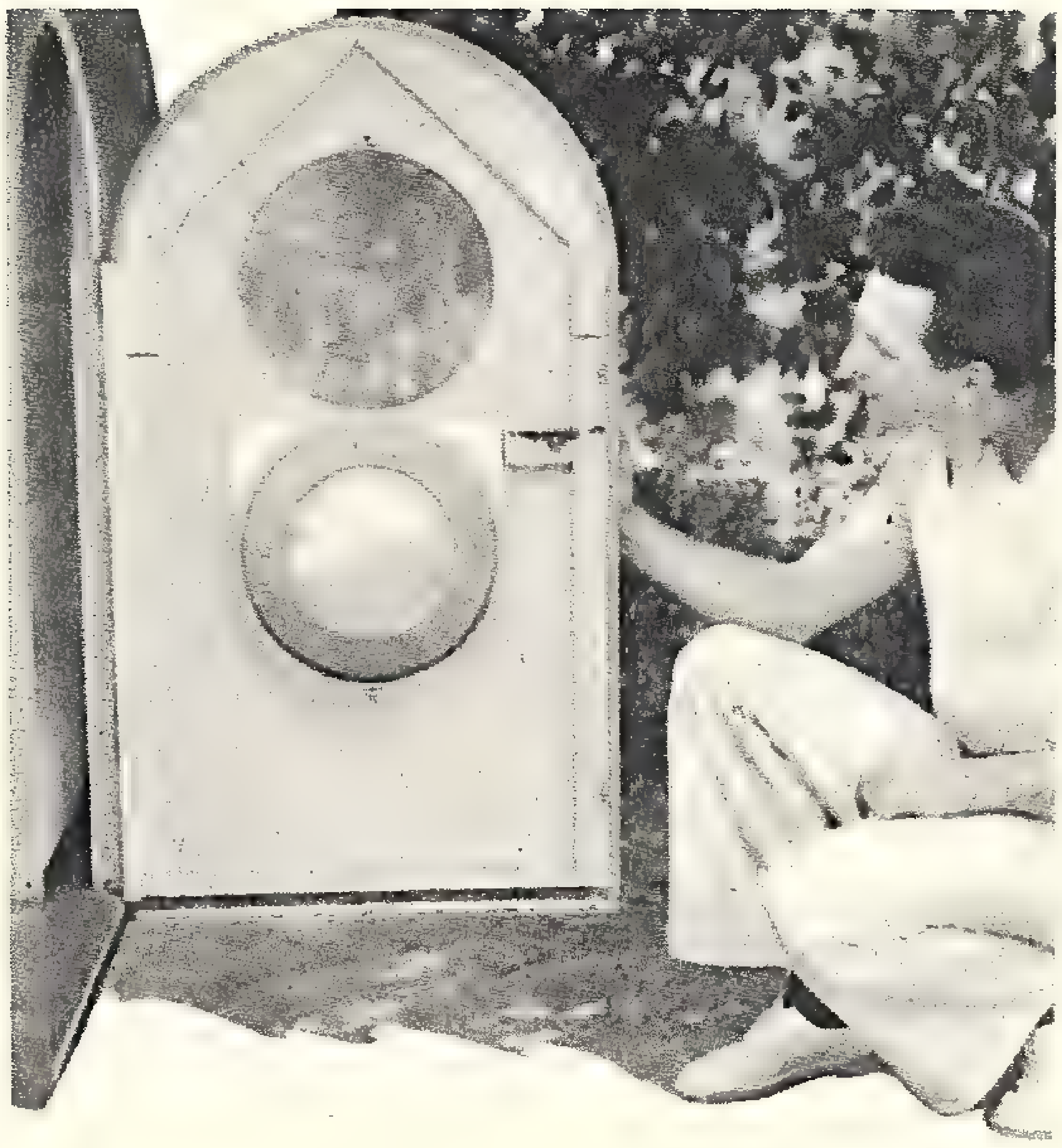


Immediately aft of this compartment the sink and stove shelf is located. This shelf is made readily detachable so that the axle may be inspected if necessary or to permit the easy placing of a jack under the axle in case of flat tires.

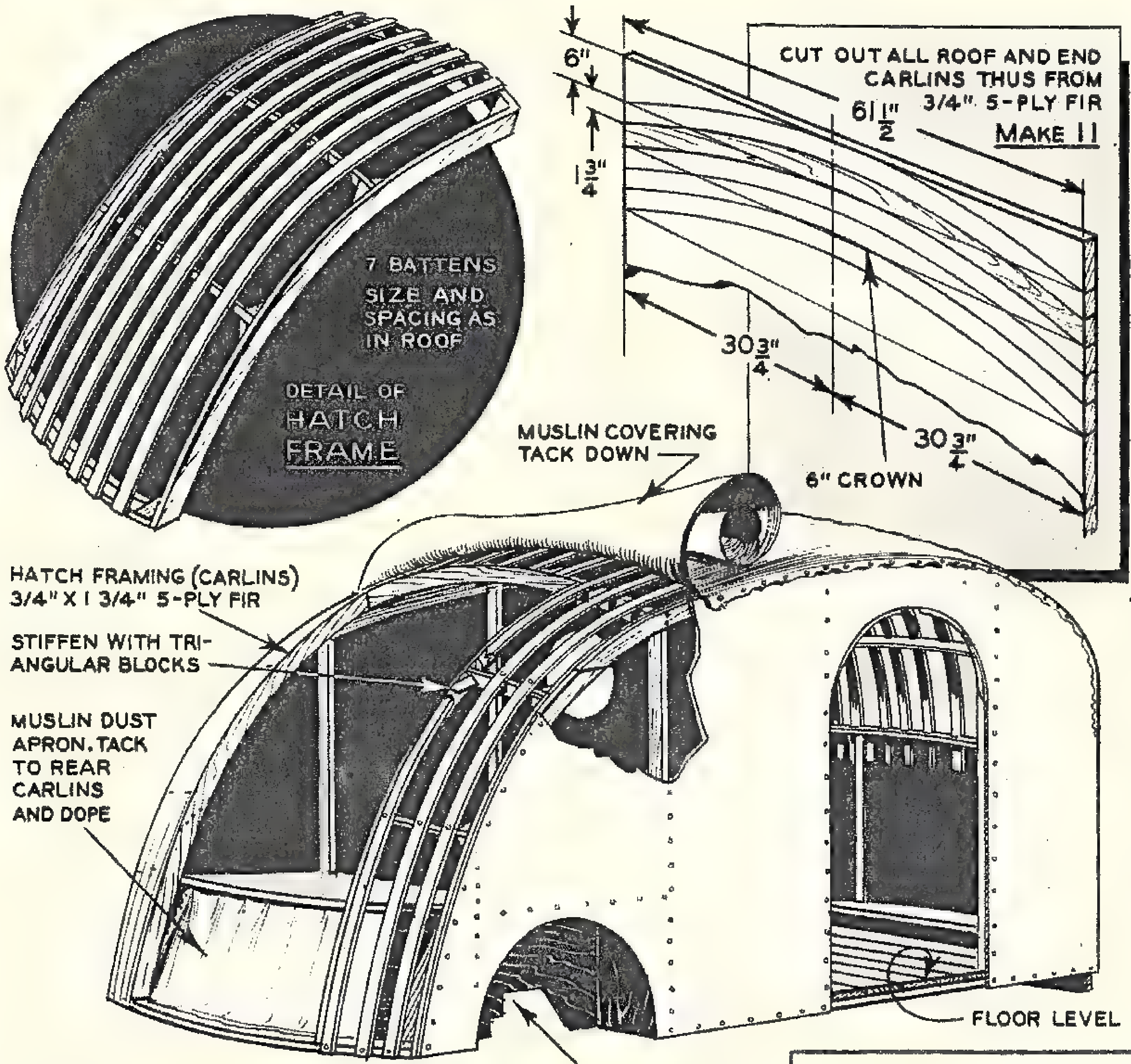
The shelf rests on a light framing of 1"x2" pine as shown in the drawings. It can be held in place by a few light screws or by four wing nuts. The stove is secured to it in the manner shown and a simple sink can be made from a large cake pan and set into the shelf with small screws.

A muslin apron, tacked from shelf carlin to rear carlin and from wheel box inner panels, serves to keep the dust out. This apron should be doped.

The tank for water may be any size and the details of its installation will naturally depend upon the size used. In any case it should be so arranged as to empty directly into the sink. Cupboards and shelves may be any way you prefer. A

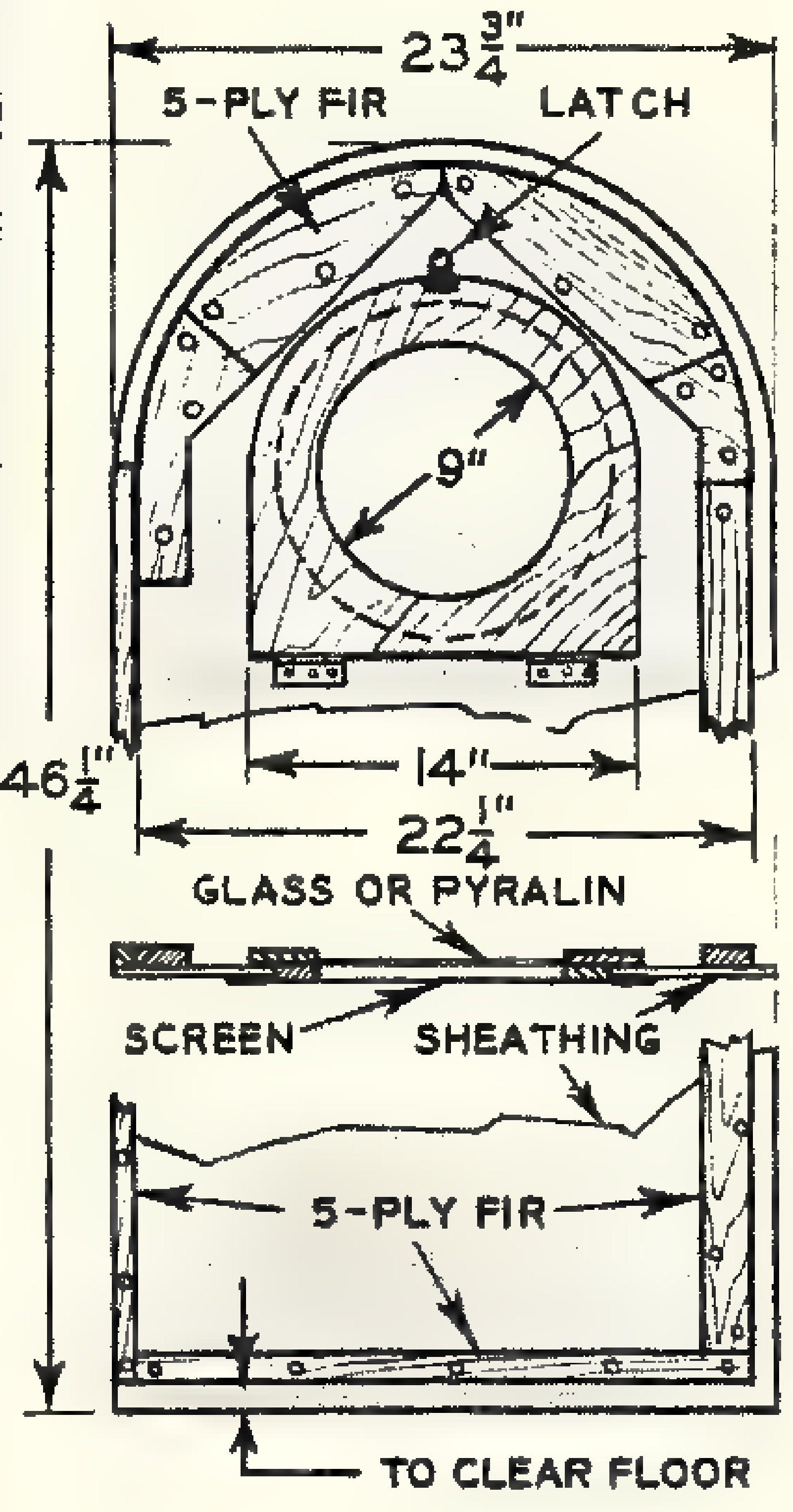


Here is an exceptionally clear picture of the simple door. It may be varied but it is hard to improve for simplicity and sturdy construction. Note the blind door handle box—not shown in the drawings below.


7 BATTENS SIZE AND SPACING AS IN ROOF
DETAIL OF HATCH FRAME
6"
1 3/4"
CUT OUT ALL ROOF AND END CARLINS THUS FROM 3/4" 5-PLY FIR
MAKE 11
61 1/2"
30 3/4"
30 3/4"
6" CROWN
MUSLIN COVERING TACK DOWN
HATCH FRAMING (CARLINS) 3/4" X 1 3/4" 5-PLY FIR
STIFFEN WITH TRIANGULAR BLOCKS
MUSLIN DUST APRON. TACK TO REAR CARLINS AND DOPE
FLOOR LEVEL

BODY DETAILS - NOTE-FASTEN BATTENS AND SHEATHING BY MEANS OF LIGHT BRASS OR COPPER SCREWS

CUT OUT INSIDE PANELS OF WHEEL BOXES TO PROVIDE CLEARANCE WHERE THE AXLE PASSES THRU.

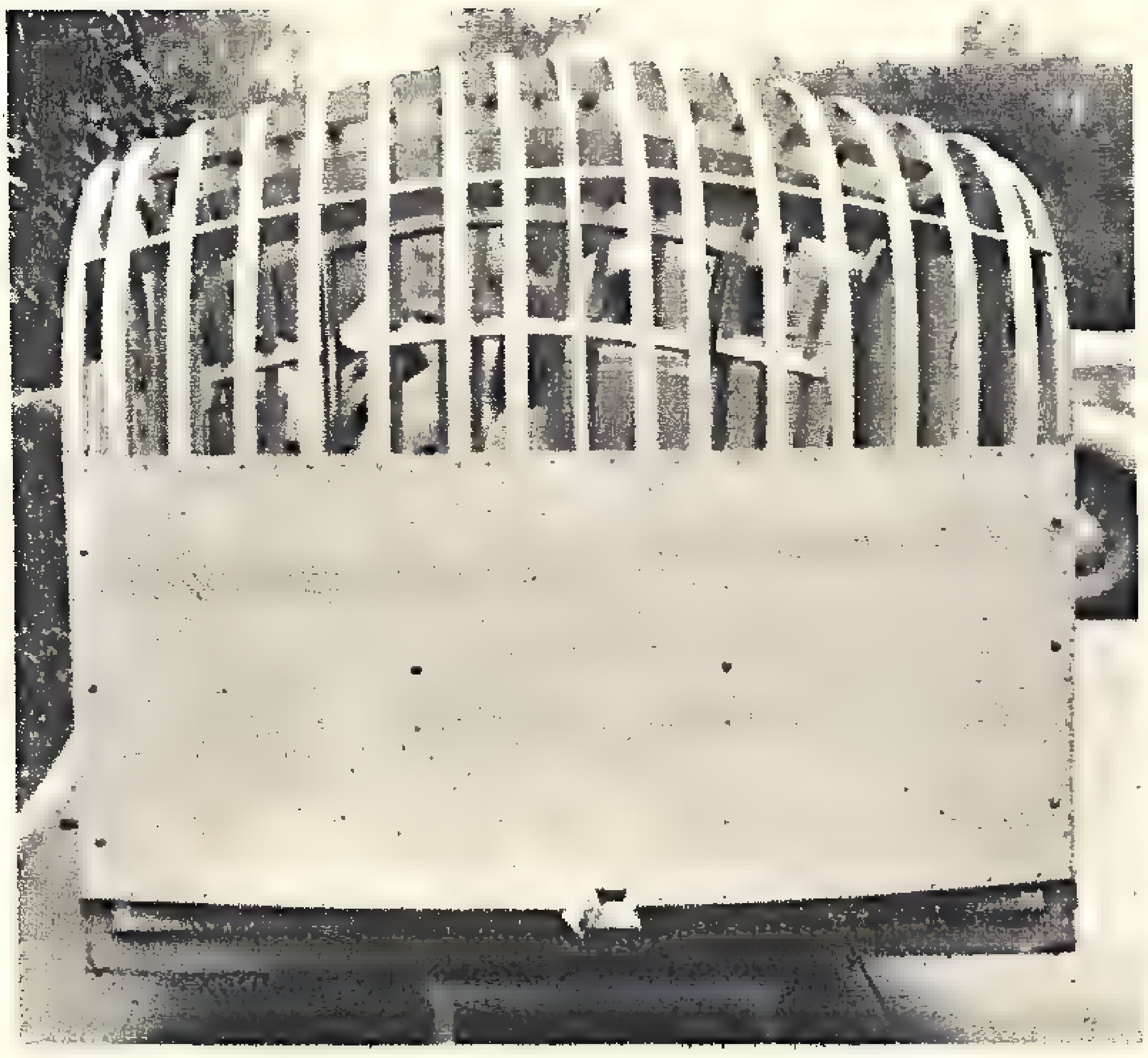

23 3/4"
5-PLY FIR
LATCH
9"
46 1/4"
14"
22 1/4"
GLASS OR PYRALIN
SCREEN
SHEATHING
5-PLY FIR
TO CLEAR FLOOR

DETAIL OF DOOR SHOWING HINGED GLASS WINDOW CLOSED

The roof carlins or beams are cut in the manner shown above. Galley hatch side carlins are cut to normal profile body lines.

RUNLITE BLUEPRINTS

Large blueprint plans for building "Runlite" printed on tough rag content paper are available from Modern Mechanix Publ. Co., 1501 Broadway, New York City. Order Blueprint No. T-29 at $2.00



This front view of body ready for roof covering to be tacked on shows the roof carlins, battens and bow details very clearly.

simple arrangement as used by Mr. Trenmore Garstone, builder of the trailer illustrated, is shown in the sketches.

Lighting details are left to the builder. Two dome lights proved ample for *Runlite*.

Paint the entire under portion of the trailer with barn red paint to prevent weathering. The interior, including the floor is finished cream. The under side of the muslin roof should not be painted. The exterior sheathing is finished in Duco gunmetal.

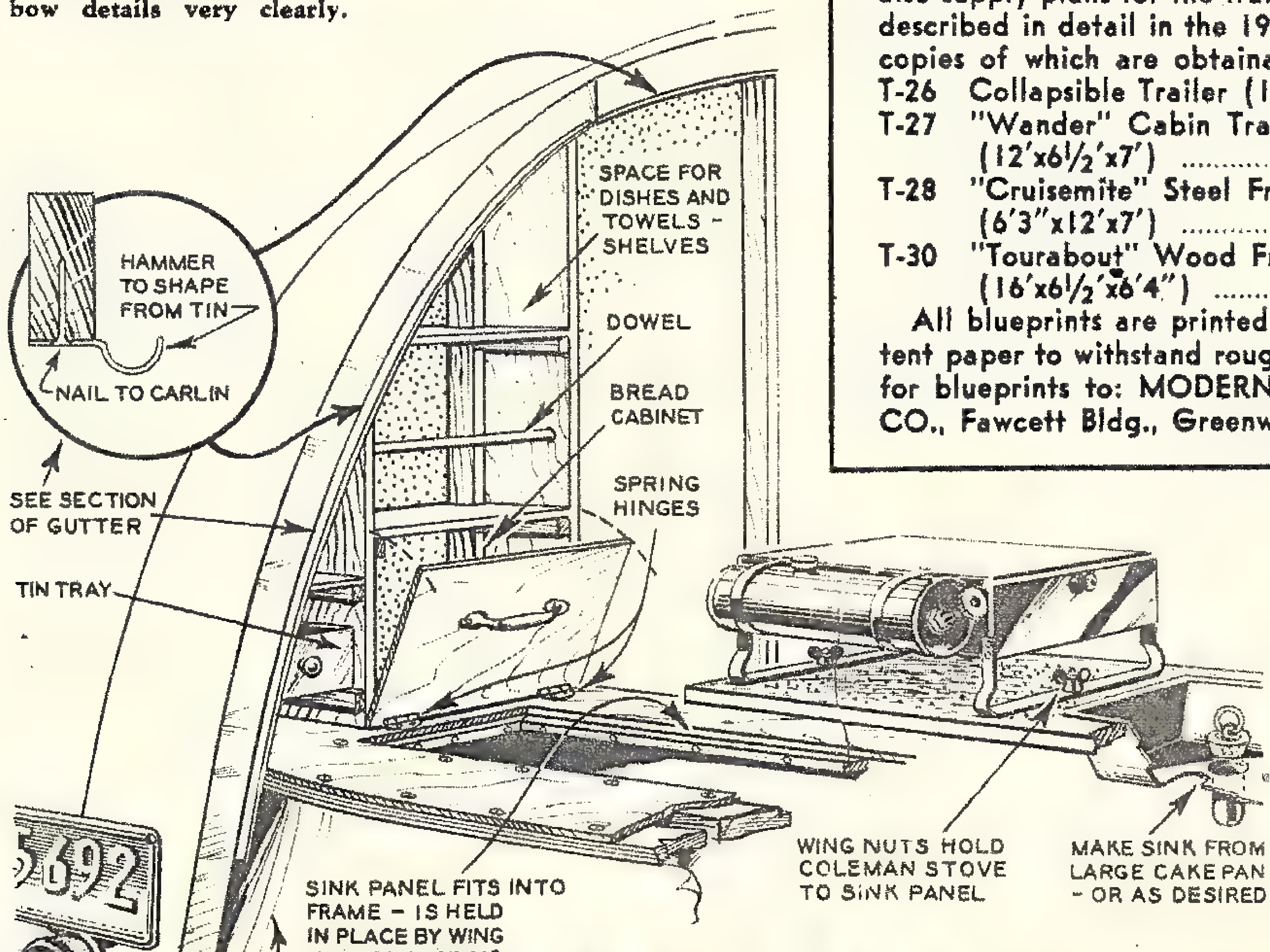
Completed, your *Runlite* trailer should not cost more than $75.00 at the outside. It can be built for less if you know how and where to buy.

OTHER MM TRAILER PLANS

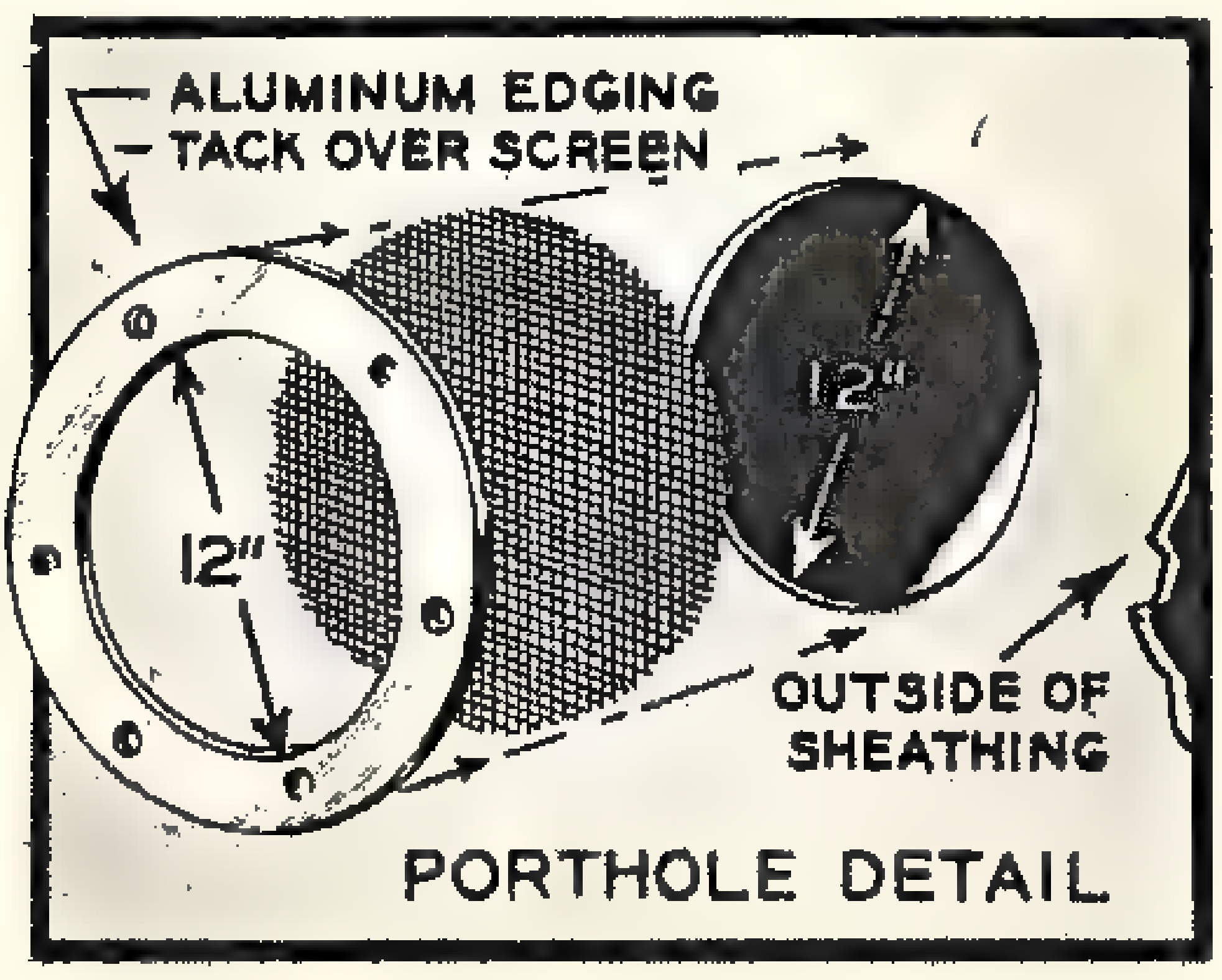
In addition to the plans for building "Runlite" which are available at $2.00 postpaid, MM can also supply plans for the trailers listed below and described in detail in the 1937 Blueprint Booklet, copies of which are obtainable for 3c.

T-26	Collapsible Trailer (14'x6'x6'10")	$1.50
T-27	"Wander" Cabin Trailer (12'x6½'x7')	1.00
T-28	"Cruisemite" Steel Frame Trailer (6'3"x12'x7')	1.50
T-30	"Tourabout" Wood Frame Trailer (16'x6½'x6'4")	1.50

All blueprints are printed on durable rag content paper to withstand rough usage. Send orders for blueprints to: MODERN MECHANIX PUBL. CO., Fawcett Bldg., Greenwich, Conn.

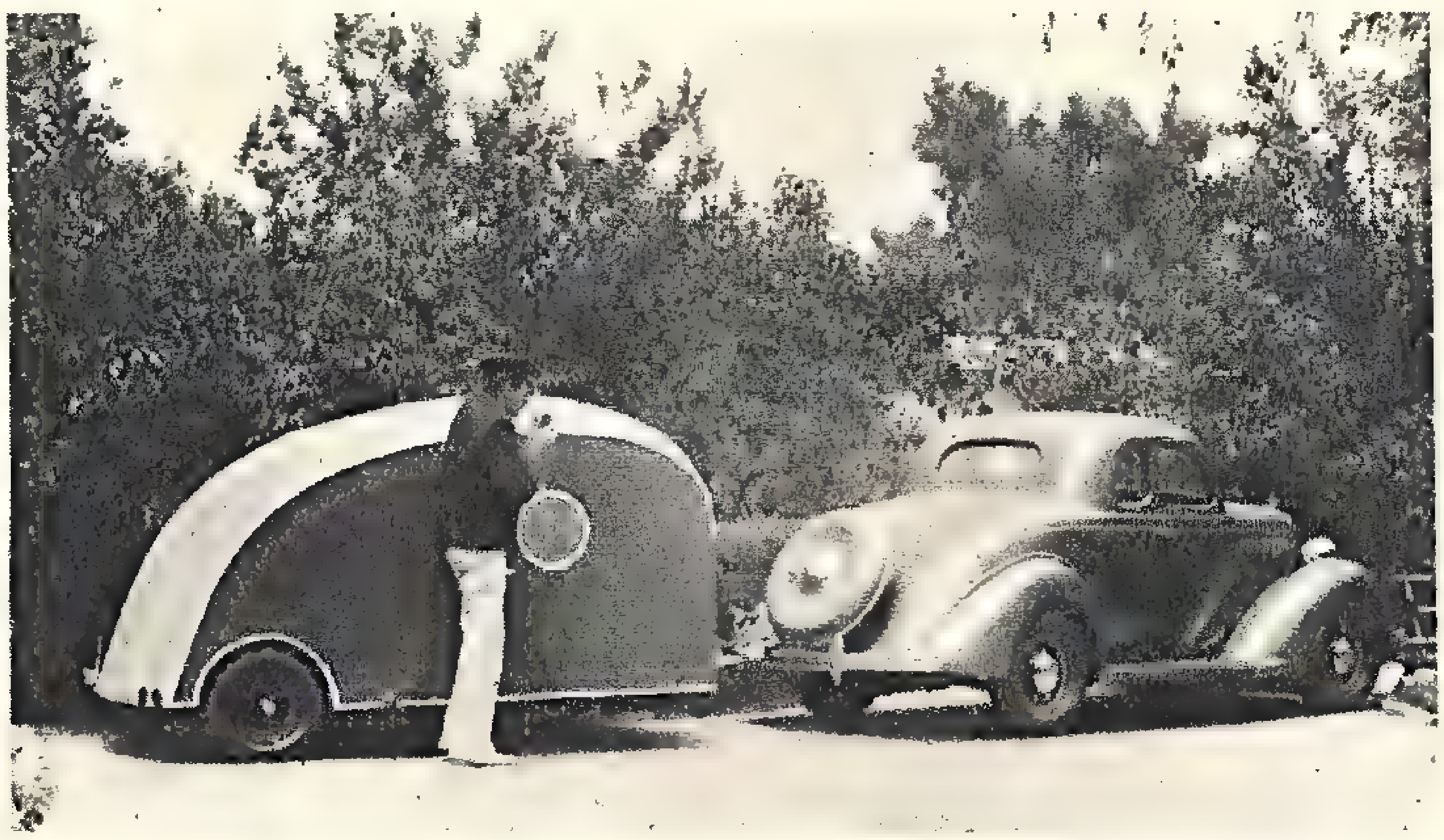

HAMMER TO SHAPE FROM TIN
NAIL TO CARLIN
SEE SECTION OF GUTTER
TIN TRAY
SPACE FOR DISHES AND TOWELS - SHELVES
DOWEL
BREAD CABINET
SPRING HINGES
WING NUTS HOLD COLEMAN STOVE TO SINK PANEL
MAKE SINK FROM LARGE CAKE PAN - OR AS DESIRED
SINK PANEL FITS INTO FRAME - IS HELD IN PLACE BY WING NUTS OR SCREWS TO PERMIT EASY REMOVAL FOR INSPECTION
MUSLIN
5692

SUGGESTED PANTRY ARRANGEMENT

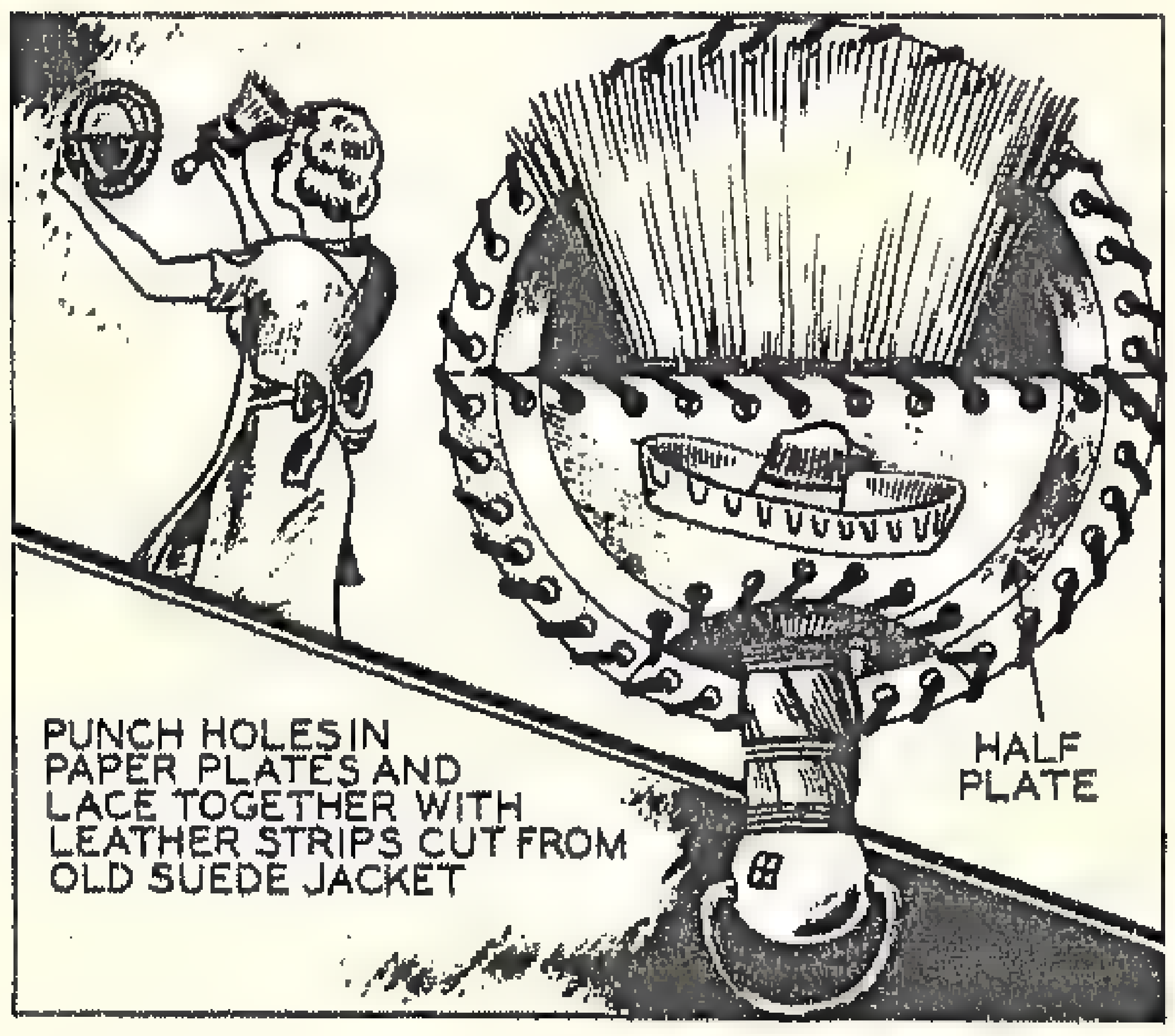

ALUMINUM EDGING
TACK OVER SCREEN
12"
12"
OUTSIDE OF SHEATHING

PORTHOLE DETAIL

The sketch at left shows one method of fixing up the pantry side of the galley. It also shows details such as the rain gutter and the stove and sink attachment. Down below the porthole exterior is depicted. There is one port on each side in this design. Immediately below we see this dashing "air flow" trailer all set to go.



Time Saving Kinks for Housewives

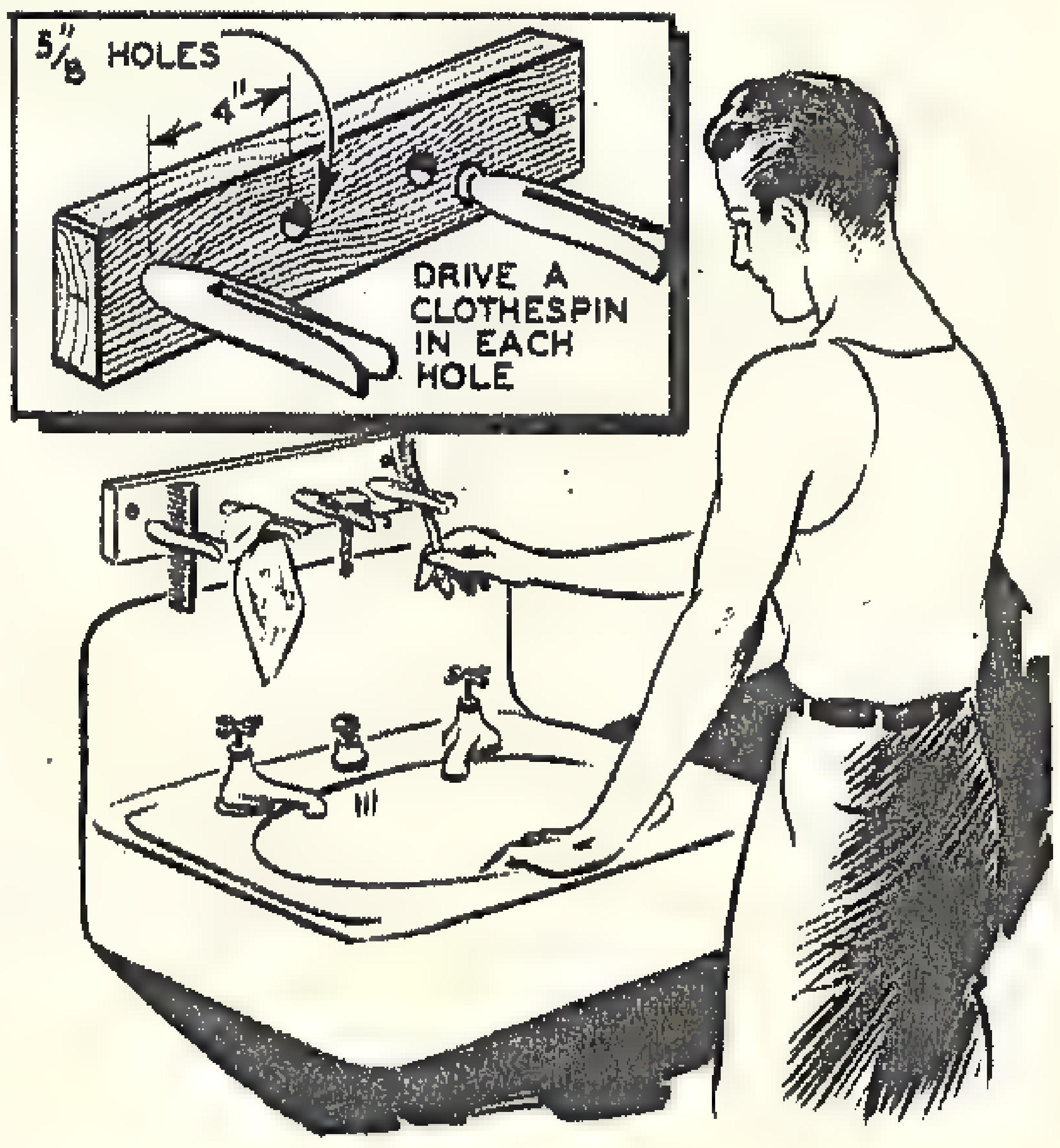

PUNCH HOLES IN PAPER PLATES AND LACE TOGETHER WITH LEATHER STRIPS CUT FROM OLD SUEDE JACKET
HALF PLATE

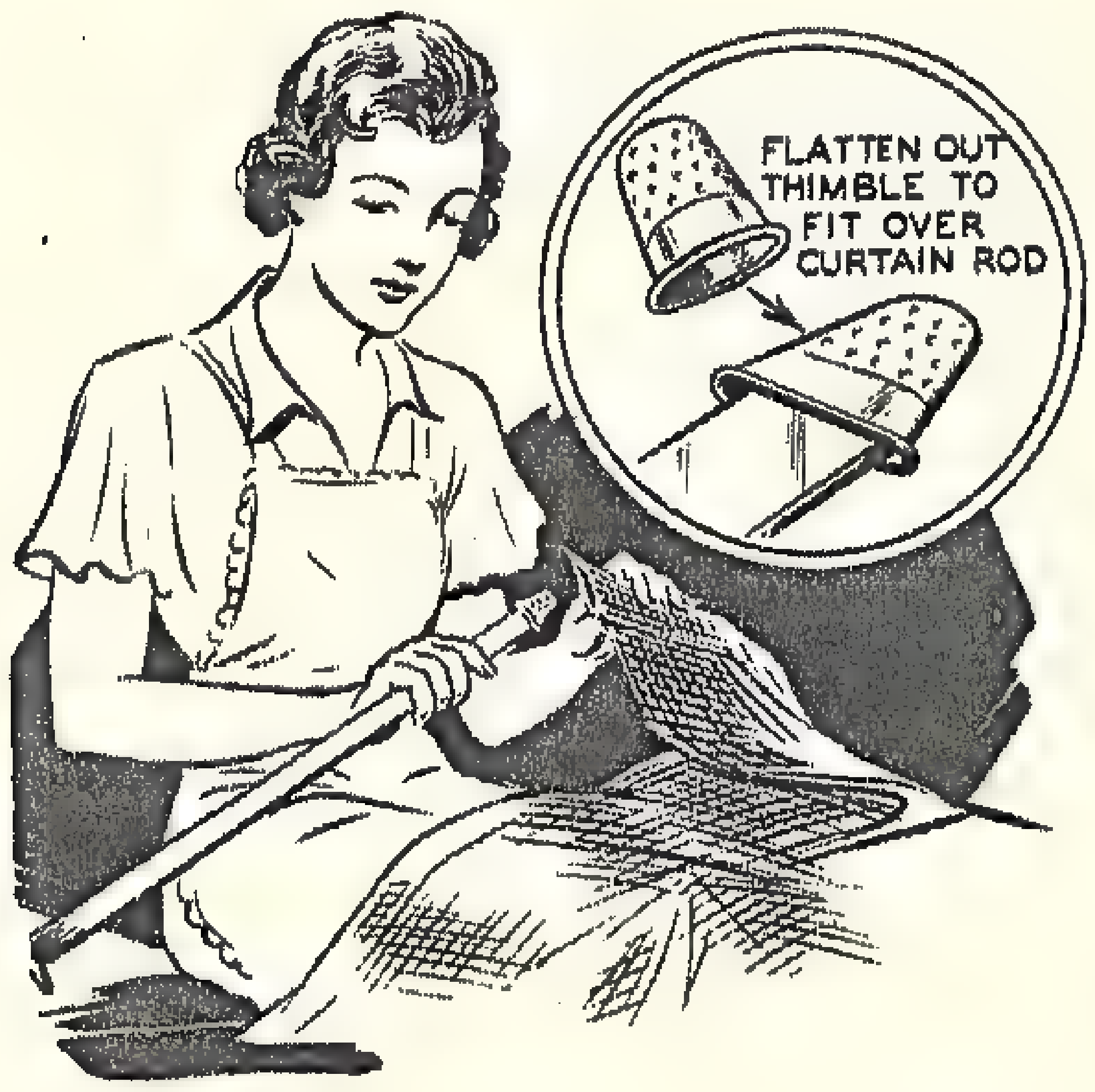
Paper Plates Make Wall Holders

ATTRACTIVE wall holders, in which may be kept recipes, grocery bills, whisk brooms or hot dish pads, can be made from ordinary paper picnic plates. Decorated in water colors the holders make very distinct and original bridge prizes. In making the holders, select two plates identical in size and punch holes around the rims. Cut one plate in half and stitch them together with colored raffia or strips of leather. If the holder is intended for a whisk broom, provision is made for handle.—Rudolph Shelton, San Diego, Calif.

Clothes Pins Form Handy Bath Rack

A CONVENIENT rack for the bathroom lavatory on which the late riser can hang his toothbrush, razor, wash cloth and comb can be made from a length of pine stock and four clothes pins. Cut the rack frame to shape and drill four ⅝-inch holes at equal distances so that four clothes pins can be inserted without the necessity of removing the heads. Apply glue and drive them into position. The rack is completed by giving it one or two coats of any good enamel. — A. H. Waychoff, Tempe, Ariz.


5/8" HOLES
4"
DRIVE A CLOTHESPIN IN EACH HOLE


FLATTEN OUT THIMBLE TO FIT OVER CURTAIN ROD

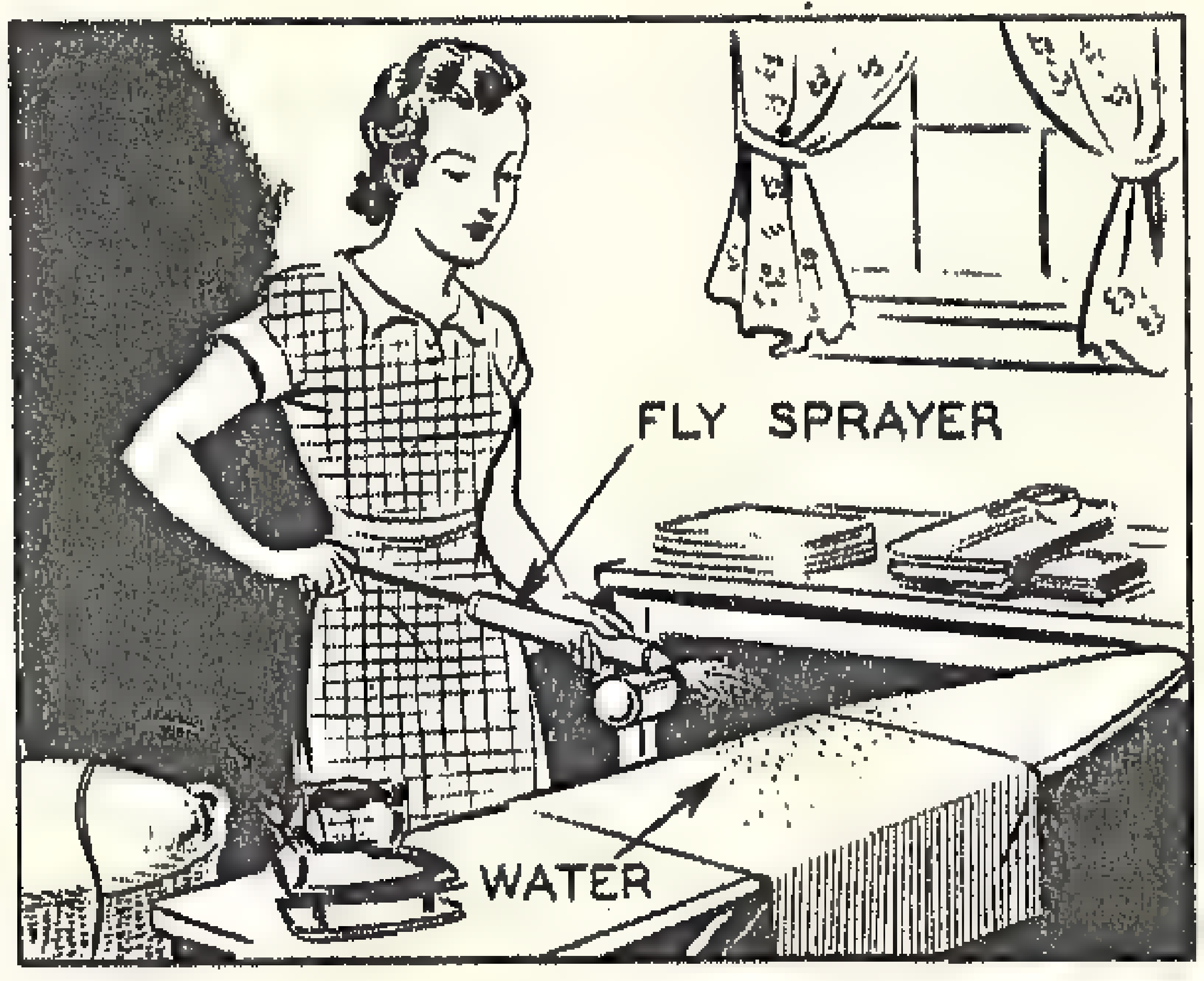
Thimble Aids In Curtain Threading

THREADING curtain rods through a narrow hem in a delicate curtain is no easy task at any time and on freshly laundered material is quite difficult, as any housewife knows.

An old sewing thimble, aluminum preferred, is flattened in a vise or with a hammer so that the rim of the thimble fans out to permit the thimble to be slipped over the end of the curtain rod. The curtains can then be slipped over the rods with ease.—E. Macuch, Nashville, Tenn.

Fly Spray Simplifies Home Ironing

BEFORE ironing home wash it is, of course, necessary to first dampen the clothing so that it will iron out well. Sprinkling the wash with the usual methods results in the water wetting only certain areas while the remainder of the material is dry. A sure way to moisten the entire fabric is through the use of a fly sprayer which has first been thoroughly cleaned of all insecticide and then filled with water. Clothing dampened with the fly sprayer will contain a uniform amount of moisture so as to insure perfect ironing.—M. Zallas, Michigan City, Ind.



Completing

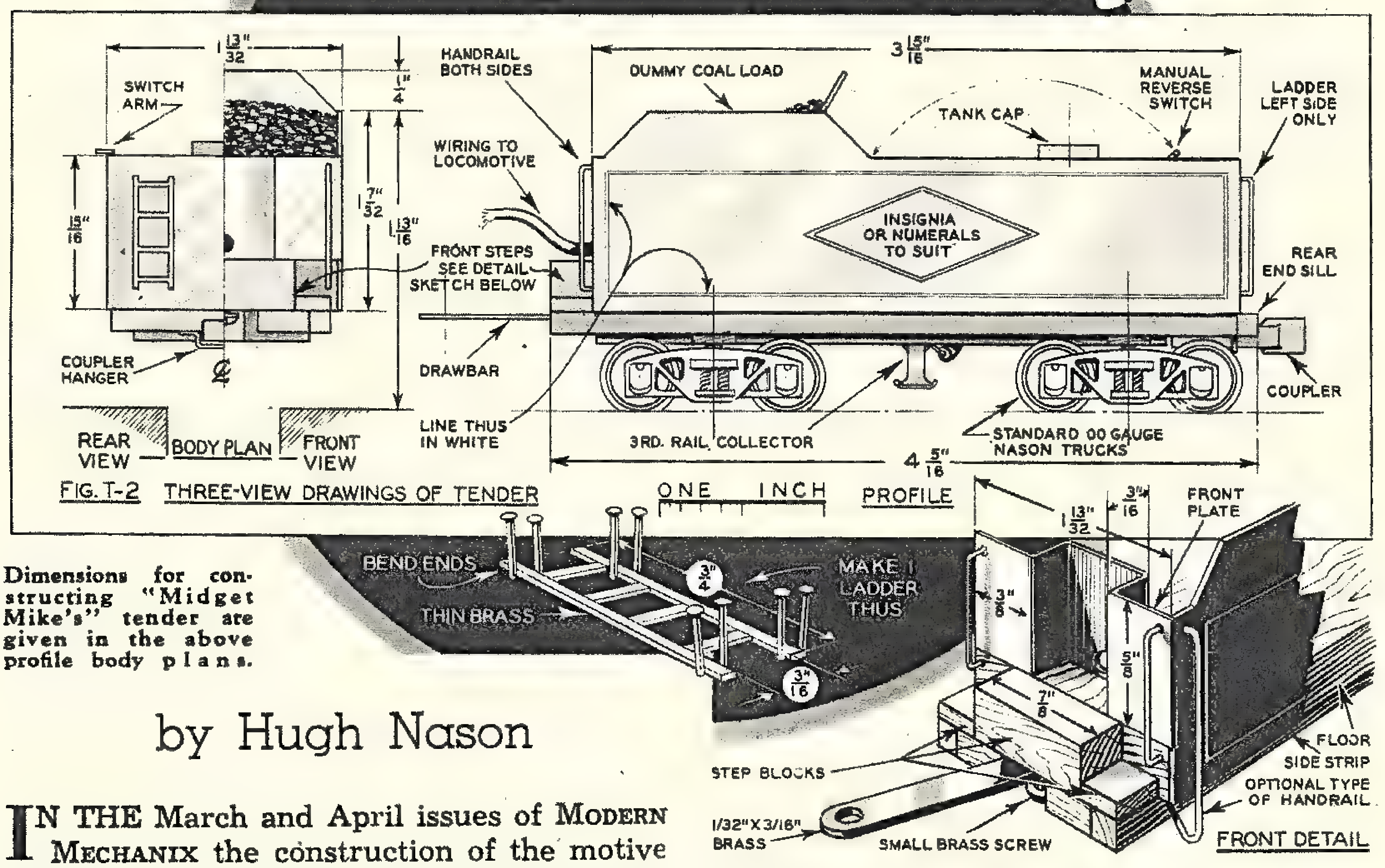

1 13/32"
SWITCH ARM
15/16"
COUPLER HANGER
℄
REAR VIEW
BODY PLAN
FRONT VIEW
1/4"
1 7/32"
1 13/16"
HANDRAIL BOTH SIDES
WIRING TO LOCOMOTIVE
FRONT STEPS SEE DETAIL SKETCH BELOW
DRAWBAR
LINE THUS IN WHITE
3 15/16"
DUMMY COAL LOAD
TANK CAP
MANUAL REVERSE SWITCH
LADDER LEFT SIDE ONLY
INSIGNIA OR NUMERALS TO SUIT
REAR END SILL
COUPLER
3RD. RAIL COLLECTOR
STANDARD 00 GAUGE NASON TRUCKS
4 5/16"
ONE INCH
PROFILE
BEND ENDS
THIN BRASS
3/4"
MAKE 1 LADDER THUS
3/16"
1 13/32"
3/16"
FRONT PLATE
3/8"
5/8"
7/8"
STEP BLOCKS
1/32"X3/16" BRASS
SMALL BRASS SCREW
FLOOR
SIDE STRIP
OPTIONAL TYPE OF HANDRAIL
FRONT DETAIL

FIG. T-2 THREE-VIEW DRAWINGS OF TENDER

Dimensions for constructing "Midget Mike's" tender are given in the above profile body plans.

The tender is formed from either sheet tin or brass and mounted on a wooden chassis to which "bought" trucks are attached. Front details are shown here.

by Hugh Nason

IN THE March and April issues of MODERN MECHANIX the construction of the motive power unit of "Midget Mike" was described. This tiny 00 gauge locomotive possessed several unique features, the most important one being that it could be constructed from ordinary materials obtainable anywhere. Brass tubing, channel and a few pieces of tin in the hands of a careful craftsman resulted in a powerful locomotive having ample traction to pull loads exceeding fifteen pounds. In this, the final installment, we take up the construction of the tender; the reverse mechanism and the wiring detail.

The tender is built of wood, brass sheet and odd ends of brass or tin. The floor of the tender is a piece of pine 1⅜" wide, $\frac{5}{16}$" thick and 3⅞" long. The sides and rear end are formed from one piece of 26 ga. brass. The whole assembly is graphically shown in Fig. T-1. In fact the accompanying drawings are unusually detailed and clear so that a careful study of them provides adequate instruction for building the tender. However, a few brief notes are added for the further convenience of the builder.

Make a template of the two sides and the back end first. Take the dimensions off the plans in Fig. T-2 and do not forget to allow for the bend when laying out the template. Scribe the bend lines with *pencil* to avoid cracking the brass sheet when bending later. Do not use a hammer to form the bend, a mallet is better, and use care to have the job square.

Fasten the metal body to the wood floor in the manner shown, filing off the heads of the ½" brass woodscrews clear to the shank after first flowing solder around each screw head so that it reaches the shank.

The chassis or underframe is built up as shown. The actual construction of the front steps and front sill may be varied as the builder desires as long as the appearance shown is retained. The rear end sill is cut out as shown in the details given in Fig. T-3 and Fig. T-1. The length of the drawbar may vary slightly to suit the radius of the curves on the track used. Bend the front plate to shape as shown and solder in place. The coal

"Midget Mike"

compartment back piece is also soldered in but at a slant as shown. The cover of the water tank may be cigar box wood or any ⅛" material. The support posts should be just high enough to bring the cover exactly level with the tender sides when it is placed in position. Allow a slight gap on one side to accommodate the reverse switch lever. The tank filler cap serves as a convenient handle to remove the cover when it is desired to get at the reversing unit.

Standard Nason 00 gauge trucks are specified. Small brass screws are used to pivot the trucks to the center sill where the cross-bolsters occur. In making the dummy coal load be sure to leave space beneath it for the several wires which run from tender to locomotive. A hole is likewise drilled in the front plate for the wires to pass through.

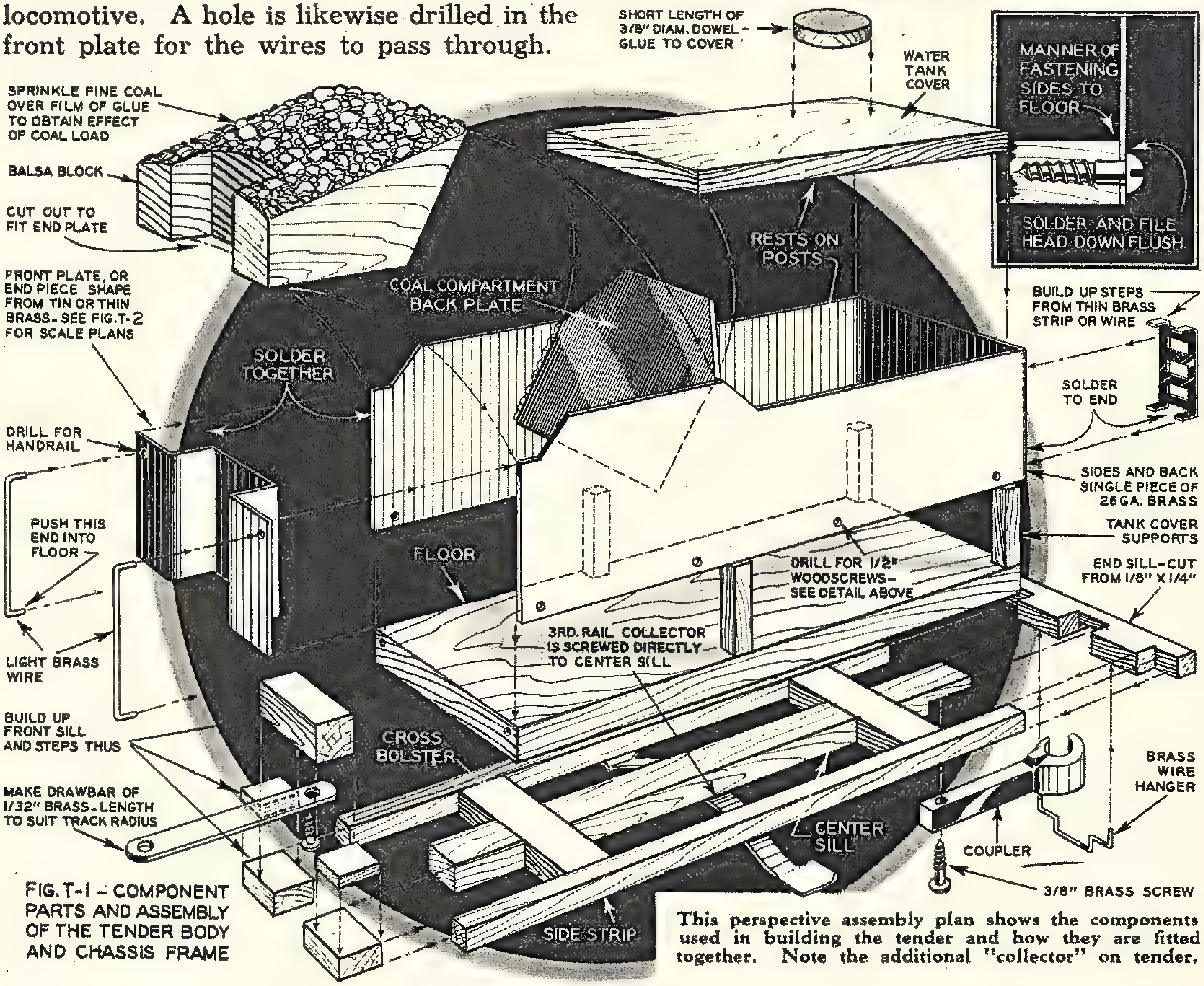

SHORT LENGTH OF 3/8" DIAM. DOWEL - GLUE TO COVER
WATER TANK COVER
MANNER OF FASTENING SIDES TO FLOOR
SOLDER AND FILE HEAD DOWN FLUSH
SPRINKLE FINE COAL OVER FILM OF GLUE TO OBTAIN EFFECT OF COAL LOAD
BALSA BLOCK
CUT OUT TO FIT END PLATE
RESTS ON POSTS
COAL COMPARTMENT BACK PLATE
FRONT PLATE, OR END PIECE SHAPE FROM TIN OR THIN BRASS - SEE FIG. T-2 FOR SCALE PLANS
SOLDER TOGETHER
BUILD UP STEPS FROM THIN BRASS STRIP OR WIRE
SOLDER TO END
DRILL FOR HANDRAIL
SIDES AND BACK SINGLE PIECE OF 28 GA. BRASS
TANK COVER SUPPORTS
PUSH THIS END INTO FLOOR
FLOOR
END SILL - CUT FROM 1/8" X 1/4"
DRILL FOR 1/2" WOODSCREWS - SEE DETAIL ABOVE
3RD. RAIL COLLECTOR IS SCREWED DIRECTLY TO CENTER SILL
LIGHT BRASS WIRE
BUILD UP FRONT SILL AND STEPS THUS
CROSS BOLSTER
BRASS WIRE HANGER
MAKE DRAWBAR OF 1/32" BRASS - LENGTH TO SUIT TRACK RADIUS
CENTER SILL
COUPLER
3/8" BRASS SCREW
SIDE STRIP

FIG. T-1 – COMPONENT PARTS AND ASSEMBLY OF THE TENDER BODY AND CHASSIS FRAME

This perspective assembly plan shows the components used in building the tender and how they are fitted together. Note the additional "collector" on tender.

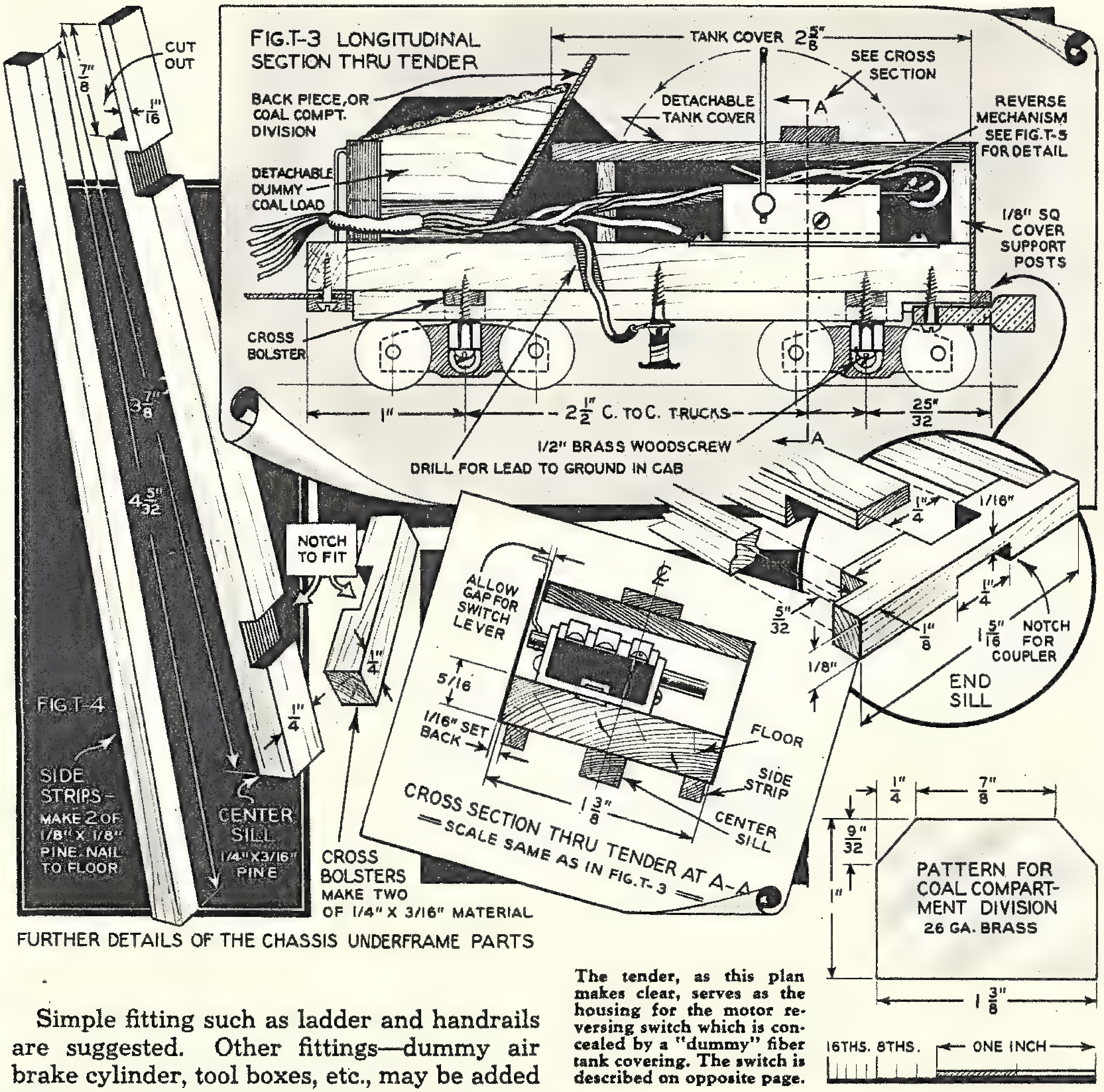


FIG.T-3 LONGITUDINAL SECTION THRU TENDER
TANK COVER 2 5/8"
SEE CROSS SECTION
BACK PIECE, OR COAL COMPT. DIVISION
DETACHABLE TANK COVER
A
REVERSE MECHANISM SEE FIG.T-5 FOR DETAIL
DETACHABLE DUMMY COAL LOAD
1/8" SQ COVER SUPPORT POSTS
CROSS BOLSTER
1"
2 1/2" C. TO C. TRUCKS
25/32"
1/2" BRASS WOODSCREW
A
DRILL FOR LEAD TO GROUND IN CAB
CUT OUT
7/8"
1/16"
3 7/8"
4 5/32"
NOTCH TO FIT
1/4"
1/4"
FIG.T-4
SIDE STRIPS — MAKE 2 OF 1/8" X 1/8" PINE. NAIL TO FLOOR
CENTER SILL 1/4" X 3/16" PINE
CROSS BOLSTERS MAKE TWO OF 1/4" X 3/16" MATERIAL
ALLOW GAP FOR SWITCH LEVER
℄
5/16
1/16" SET BACK
1 3/8"
FLOOR
SIDE STRIP
CENTER SILL
CROSS SECTION THRU TENDER AT A-A
SCALE SAME AS IN FIG.T-3
1/4"
1/16"
5/32
1/8"
1/4"
1/8"
1 5/16
NOTCH FOR COUPLER
END SILL
1/4"
7/8"
9/32"
1"
PATTERN FOR COAL COMPARTMENT DIVISION 26 GA. BRASS
1 3/8"
16THS. 8THS. ONE INCH

FURTHER DETAILS OF THE CHASSIS UNDERFRAME PARTS

The tender, as this plan makes clear, serves as the housing for the motor reversing switch which is concealed by a "dummy" fiber tank covering. The switch is described on opposite page.

Simple fitting such as ladder and handrails are suggested. Other fittings—dummy air brake cylinder, tool boxes, etc., may be added to suit. With this work completed the locomotive is ready for painting.

To prepare the model for painting, remove the motor and wash the parts with hot water to which "Oakite" has been dissolved. This solution will take off all grease which has gathered on the model. Then rinse in vinegar and put in a warm place to dry. Be careful not to handle the model or the paint will not adhere to the grease from your fingers. To hold the model while painting, wrap the part you are holding with a soft cloth. Now using a good quality flat black enamel, paint the entire engine and tender black except the tires on the drivers, the top of the tender, drive rods, cross head guides, piston rods and valve rods. These parts are painted with aluminum paint.

The reverse unit is located in the tender of "Midget Mike." This device, which is easily constructed, is designed for manual reversing of the engine as shown in Fig. 5. The base is a piece of ¾" brass channel 1" long to which one spring brass contact is riveted as shown on the end view. The fiber block which is used as a base for the other three contacts is a piece of standard ½" by ¼" fiber cut to a length of $\frac{11}{16}$". Cut a groove in the bottom to clear the bottom contact. Drill a No. 43 hole in each side of the channel as shown in the side view. Push the fiber block in place and drill No. 50 and tap 2-56 to match the two holes already drilled. Fasten the block in place with brass 2-56 screws. Now drill three No. 50 holes for the upper contacts and tap 2-56.

To make the rotor cut a piece of $\frac{9}{32}$" diameter thin wall brass tube to a length of $\frac{9}{16}$". Cut out as shown in the detail of the rotor, but do not separate the two parts until a ⅝″ length of ¼″ diameter fiber tube with an ⅛″ hole has been driven into the brass tube and projects slightly at both ends. Then cut as shown on the plans with a fine hacksaw or jeweler's saw. Note they are cut at opposite ends. Drill a No. 28 hole in each side of the channel as indicated, then insert the ⅛″ rod in one side, drive through the rotor and then through the other side of the channel until it projects about ⅛″. The other three contacts are now cut of spring brass and are a little more than ⅛″ wide. Drill a No. 44 hole in each as indicated and fasten to the fiber block with ⅛″ long 2-56 brass machine screws. A No. 60 hole is drilled in the rotor shaft to take the reversing handle, which is a piece of brass wire soldered in place. Wire the reverse unit according to the diagram given.

Solder a strip of brass on the bottom so that it can be screwed to the floor of the tender with brass wood screws. The reverse arm projects up through the slot between the tender side and tank cover. So that the reversing switch can be grasped easily, bend the end of the arm outward so as to form an "L" shaped handle. The proper location of this unit is shown in the cross section drawings of Fig. T-3.

An additional collector is mounted underneath the chassis of the tender and is identical in construction to the one used on the locomotive, itself, and described in a previous installment. Wire up the reversing unit to the motor carefully, otherwise your motor will not run in either direction. If difficulty is experienced in connecting the reverse switch, some experimenting will soon reveal the correct hookup required.

"Midget Mike" is now complete and ready for hauling its first train. If you are a new convert to this hobby it will, of course, be necessary for you to construct your track layout. Tracks are laid in much the same manner as the conventional railroad rails using brass track and miniature ties. These materials are available from any model railway supply house.

A test run with "Midget Mike" will start you on a hobby with endless thrills and one that offers the craftsman with little or much money the maximum from his investment.

"MIDGET MIKE" BLUEPRINT PLANS

Complete plans for building "Midget Mike" in actual scale size are available in blueprint form at $3.00 per set. The plans are printed on genuine tough rag content blueprint paper to withstand rough workshop usage. Order blueprint No. M-408 from:

Modern Mechanix Publ. Co., Greenwich, Conn.

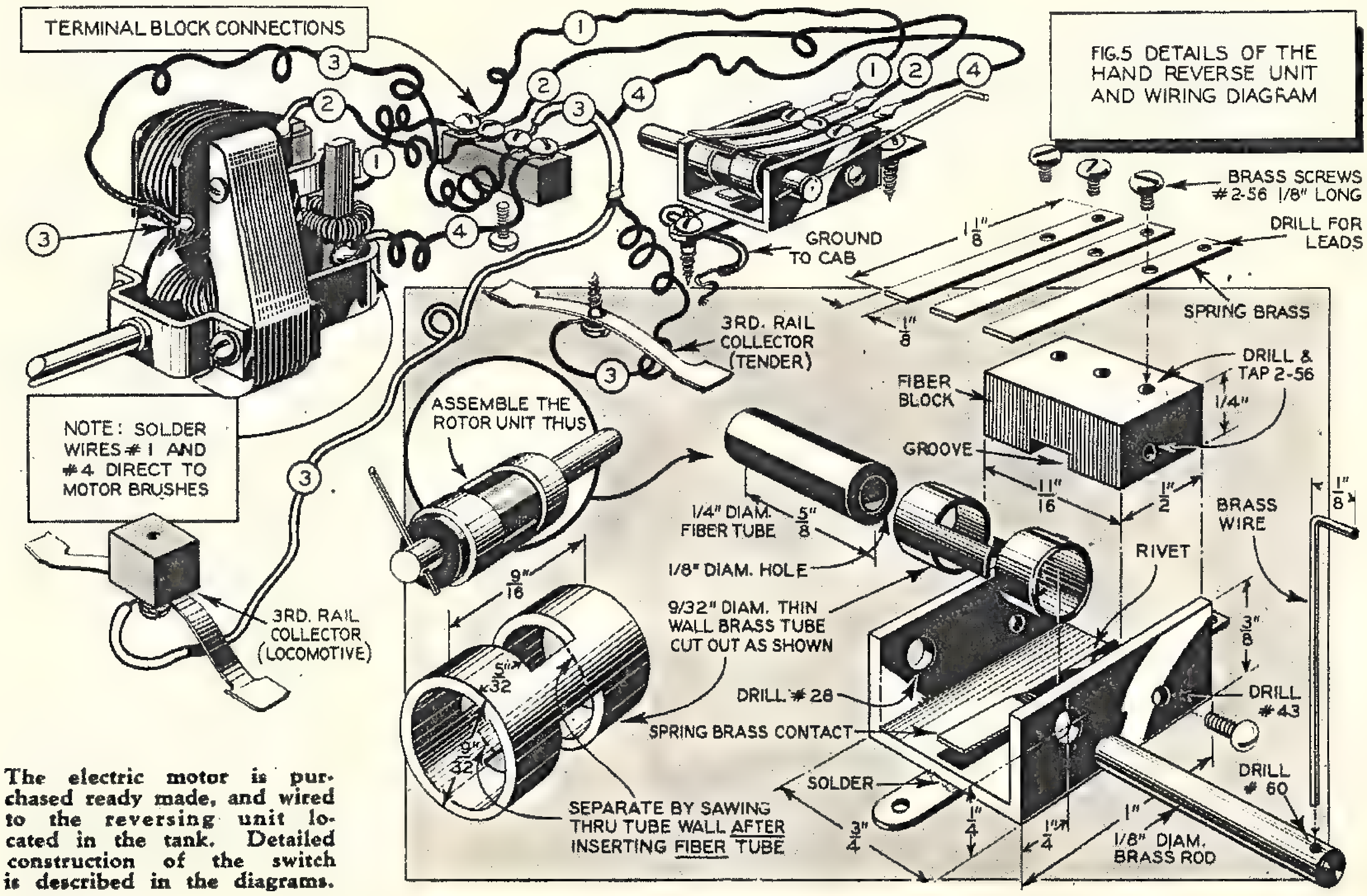
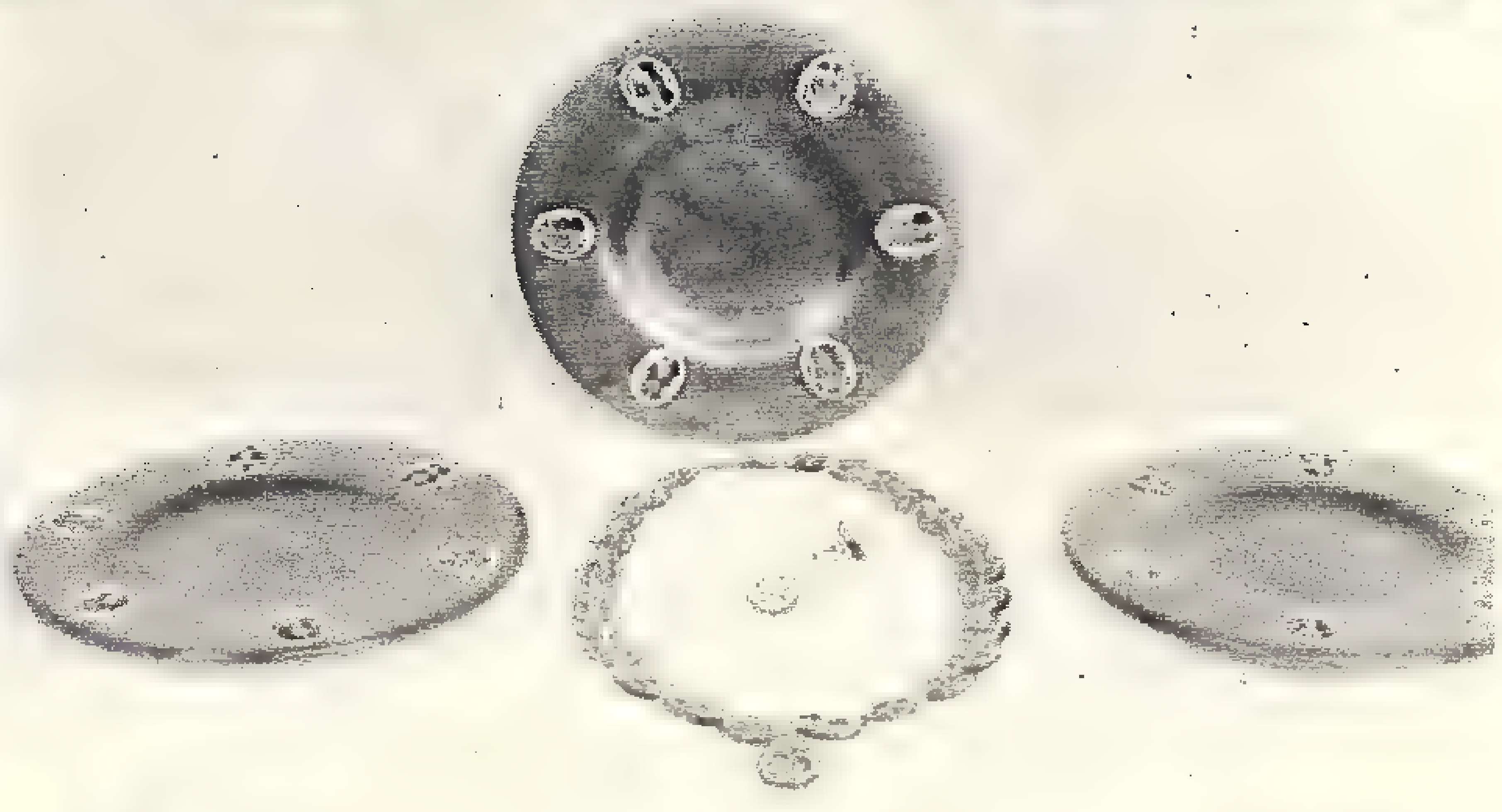

TERMINAL BLOCK CONNECTIONS
①
②
③
④
NOTE: SOLDER WIRES #1 AND #4 DIRECT TO MOTOR BRUSHES
3RD. RAIL COLLECTOR (LOCOMOTIVE)
GROUND TO CAB
3RD. RAIL COLLECTOR (TENDER)
BRASS SCREWS #2-56 1/8" LONG
DRILL FOR LEADS
1 1/8"
1/8"
SPRING BRASS
DRILL & TAP 2-56
1/4"
FIBER BLOCK
GROOVE
11/16"
1/2"
1/8"
BRASS WIRE
ASSEMBLE THE ROTOR UNIT THUS
1/4" DIAM. FIBER TUBE
5/8"
1/8" DIAM. HOLE
9/16"
9/32" DIAM. THIN WALL BRASS TUBE CUT OUT AS SHOWN
RIVET
3/8"
DRILL #43
DRILL #28
5/32"
9/32"
SPRING BRASS CONTACT
SOLDER
DRILL #60
SEPARATE BY SAWING THRU TUBE WALL AFTER INSERTING FIBER TUBE
3/4"
1/4"
1/4"
1"
1/8" DIAM. BRASS ROD

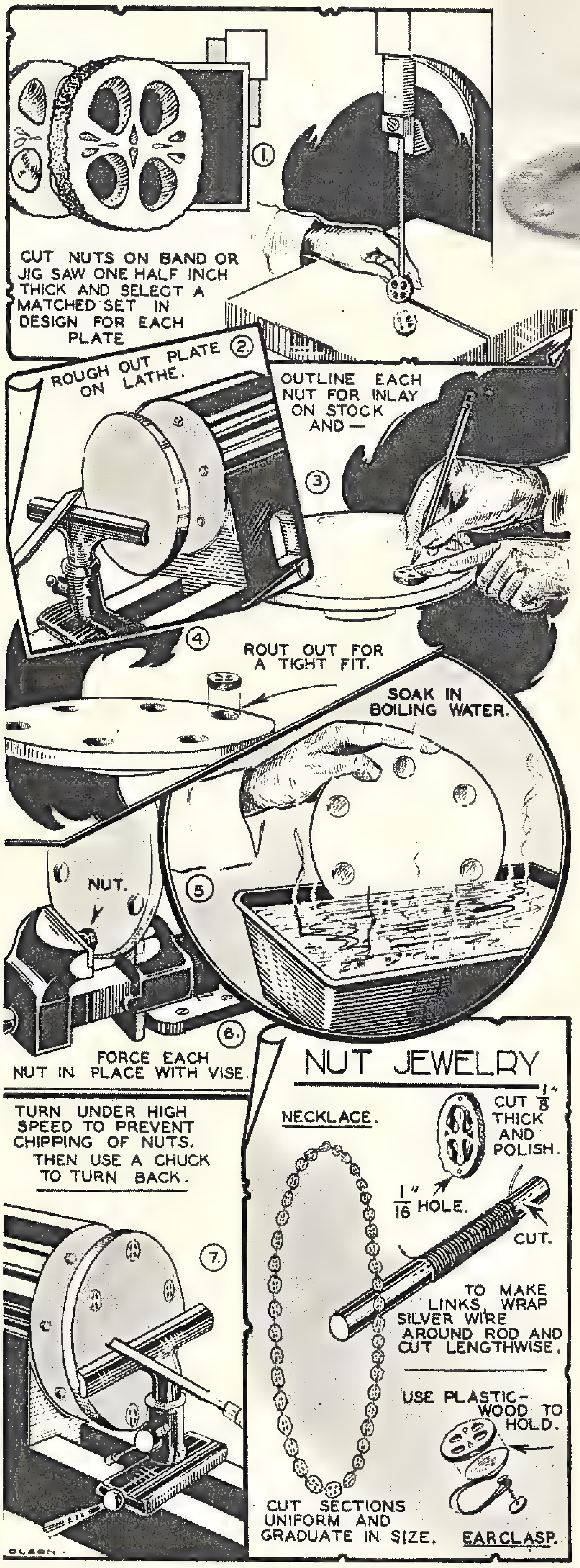
FIG.5 DETAILS OF THE HAND REVERSE UNIT AND WIRING DIAGRAM

The electric motor is purchased ready made, and wired to the reversing unit located in the tank. Detailed construction of the switch is described in the diagrams.

Novelty Projects Made With Walnut Shells



At right are shown a few of the many inlay and novelty jewelry projects which can be fashioned in the workshop from walnut shells.


CUT NUTS ON BAND OR JIG SAW ONE HALF INCH THICK AND SELECT A MATCHED SET IN DESIGN FOR EACH PLATE
1.
ROUGH OUT PLATE ON LATHE.
2
OUTLINE EACH NUT FOR INLAY ON STOCK AND—
3
4
ROUT OUT FOR A TIGHT FIT.
SOAK IN BOILING WATER.
NUT.
5
6.
FORCE EACH NUT IN PLACE WITH VISE.
TURN UNDER HIGH SPEED TO PREVENT CHIPPING OF NUTS. THEN USE A CHUCK TO TURN BACK.
7.
NUT JEWELRY
NECKLACE.
CUT 1/8" THICK AND POLISH.
1/16" HOLE.
CUT.
TO MAKE LINKS, WRAP SILVER WIRE AROUND ROD AND CUT LENGTHWISE.
USE PLASTIC-WOOD TO HOLD.
CUT SECTIONS UNIFORM AND GRADUATE IN SIZE.
EARCLASP.
OLSON.

The step by step procedure in making walnut inlays and novelty jewelry is described in these illustrations.

by Oscar E. Olson

THE symmetrical internal design of black walnuts lends itself beautifully to inlay work and novelty jewelry. The hard shell works to a bone-like finish and the lace-like structure, when properly cut, is amply reenforced to withstand hard usage.

For the turned plate inlay work select nuts uniform in size, without weather checks, and cut a cross, ½" center section, out of each nut on the band or jig saw as indicated in Fig. 1. For each plate, select a matched set of nuts in design, then turn out a piece of 1" stock slightly larger than the desired size of the plate as shown in Fig. 2. In doing this, glue the stock on waste material with a piece of heavy wrapping paper in between, and mount on lathe faceplate. The paper will facilitate separation, preparatory to chuck turning.

On the roughed out plate trace each nut separately, as shown in Fig. 3. Do not remove the face plate from the stock until all front turning is completed. Next rout out each nut hole for a very tight fit as Fig. 4 describes. The routing may be done by boring a number of small holes completely through the stock close to the line and then dressing down the sharp protruding edges with a rat-tail file. Follow by soaking the plate in boiling water for a few minutes, one hole at a time, referring to Fig. 5, and force each nut in the stock with a vise as shown in Fig. 6. Do not place the whole plate in the water as the glue holding the stock to waste material will loosen. In this operation the wood should be soaked sufficiently to allow the jagged corners of the nut to squeeze in smoothly without cracking the stock. Glue can be placed on the nut before forcing in, but this should not be necessary.

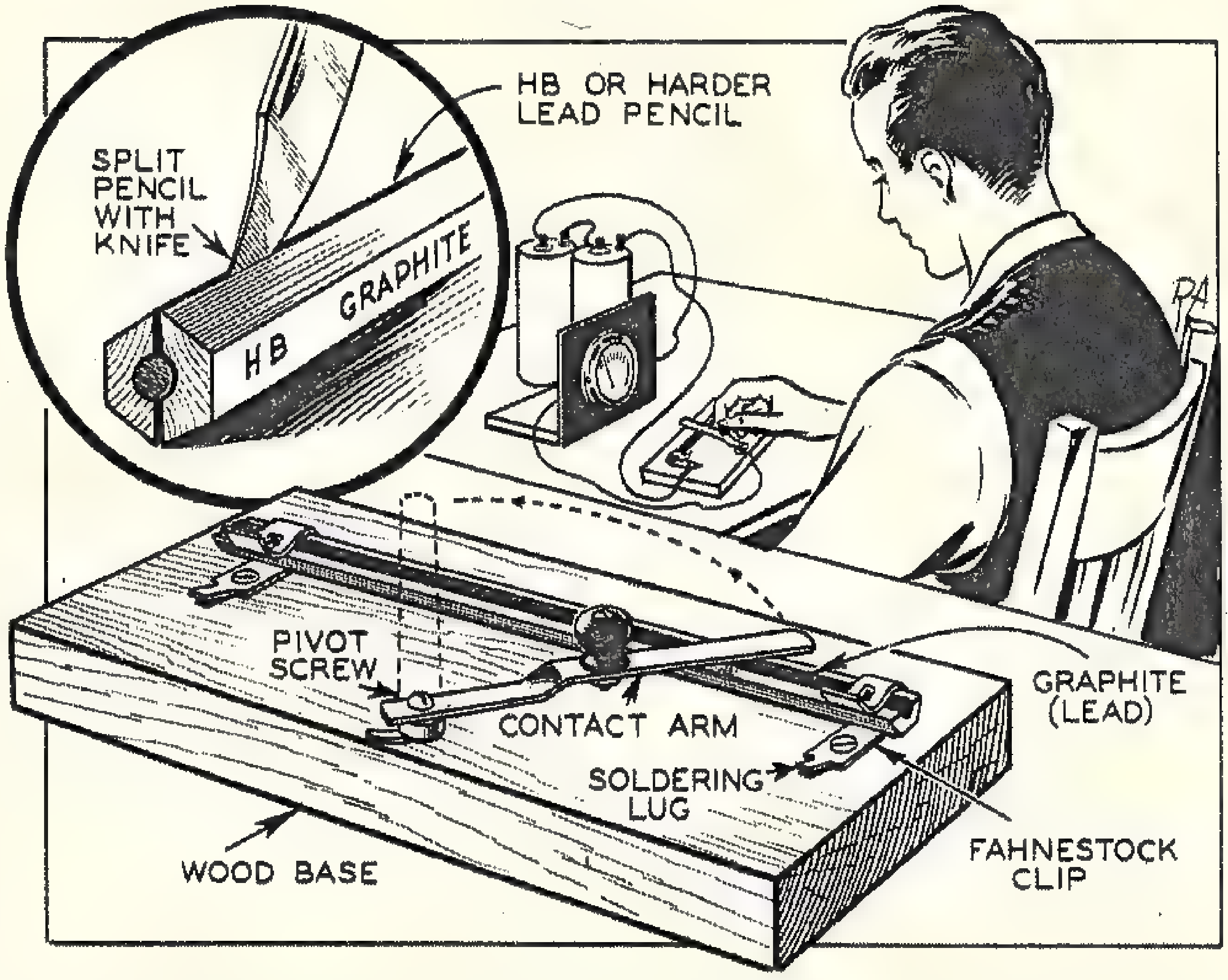
[*Continued on page* 128]

RADIO SPARKS
and
ELECTRICAL EXPERIMENTS

Novel POTENTIOMETER Made From Lead Pencil

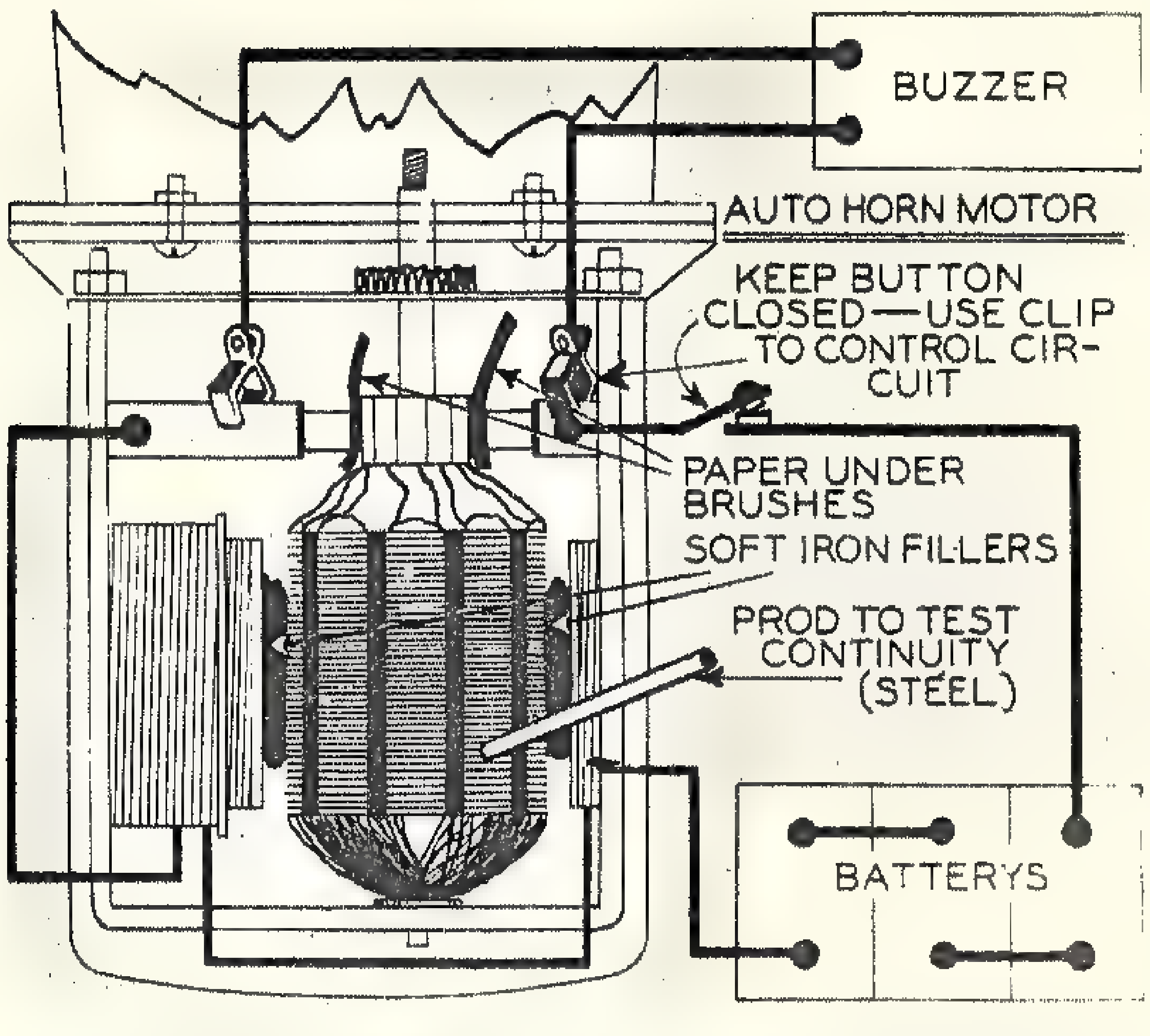
WHEN a suitable potentiometer or rheostat for an electrical experiment is not available a practical makeshift device can be constructed from an ordinary hard lead pencil. The pencil is split in half so as to expose the graphite writing element commonly referred to as lead. Secure three fahnestock clips and mount them on a block of wood in the manner shown in the accompanying illustrations then clip the pencil under them so that the lead contacts the metal.

From a length of spring brass or stiff copper form a sliding contact arm. Drill two holes in the strip; one for the knob and another for the pivot screw. Mount the arm in position and the potentiometer is completed. If the resistance of the device is not sufficient it can be raised by filing down the surface of the lead.


HB OR HARDER LEAD PENCIL
SPLIT PENCIL WITH KNIFE
HB GRAPHITE
PA
PIVOT SCREW
CONTACT ARM
GRAPHITE (LEAD)
SOLDERING LUG
WOOD BASE
FAHNESTOCK CLIP

An ordinary hard lead pencil forms the resistance element for this novel emergency potentiometer. Split the wood through the center so that the lead is exposed and mount pencil under fahnestock clips as shown. A brass contact arm slides over the lead to provide any desired resistance.

Buzzer Tests Motor Windings

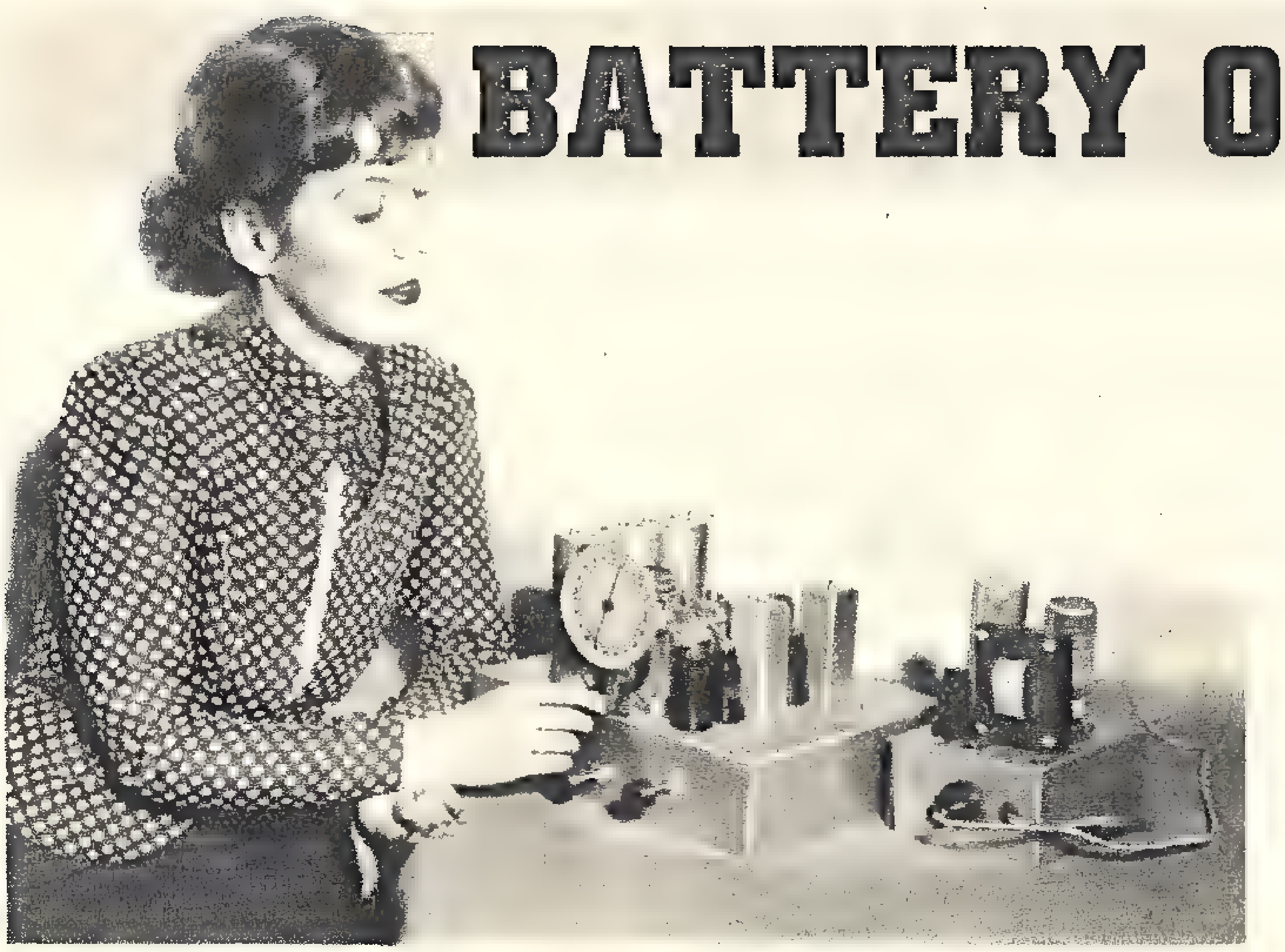

BUZZER
AUTO HORN MOTOR
KEEP BUTTON CLOSED—USE CLIP TO CONTROL CIRCUIT
PAPER UNDER BRUSHES
SOFT IRON FILLERS
PROD TO TEST CONTINUITY (STEEL)
BATTERYS

Open windings and short circuits in small electric motors can be traced with a door buzzer using method shown here. Paper strips are slipped under brushes and soft iron strips inserted in air gaps. With buzzer connected motor vibrates like growler.

WHILE the usual method employed to trace defects in small D.C. motors is to take the motor apart, a practical test of the field and armature can be made with the motor in its assembled state. An inexpensive door buzzer comprises the testing equipment and is connected to the storage battery in the usual way when making the continuity test of the field coils. To test the field attach the prods across each winding. If the buzzer functions the coil is satisfactory; if not, the coil is open.

In making an armature check-up, lift up the brushes and insert a piece of paper under them so as to provide complete insulation. Next place a strip of iron in the space between the armature core and each pole face and connect the buzzer across the brushes. Connected to the battery the motor armature functions as a growler if it is in good condition.

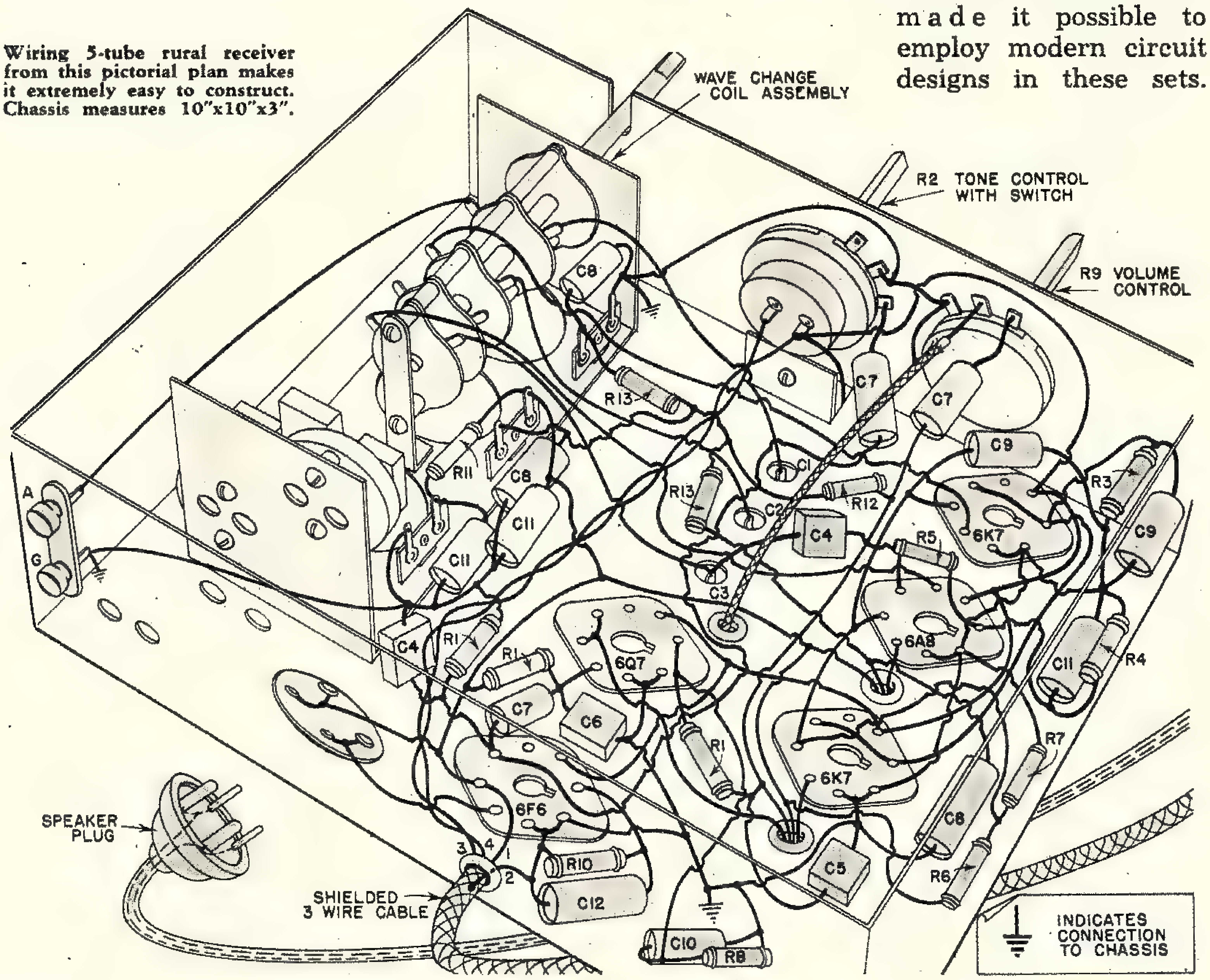
BATTERY OPERATES



Rural fans no longer need be without a modern metal tube radio. A single battery supplies current.

FOR the rural listener who does not have access to city current nothing is quite as annoying as the constant difficulties experienced with early battery receivers suddenly going dead in the middle of a program. Ancient circuits and faulty tubes, subject to microphonic noises, are responsible for much of the trouble and a new set of batteries every week will do little to improve or insure reception.

With the advent of the vibrator B power supply the farm receiver procured a new lease on life, for the unit made it possible to employ modern circuit designs in these sets.



Wiring 5-tube rural receiver from this pictorial plan makes it extremely easy to construct. Chassis measures 10"x10"x3".

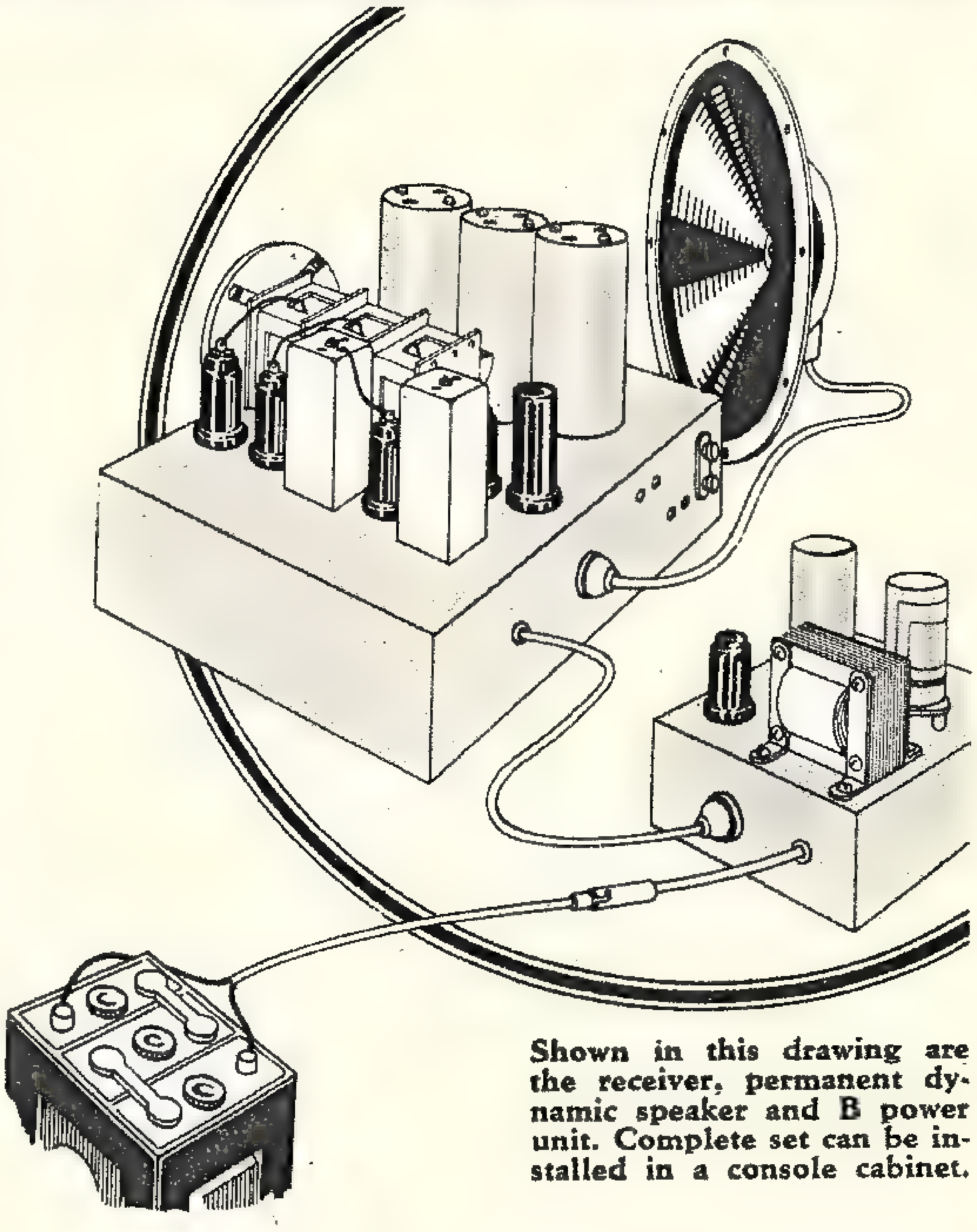
WAVE CHANGE COIL ASSEMBLY
R2 TONE CONTROL WITH SWITCH
R9 VOLUME CONTROL
C8
R13
C7
C7
C9
R3
C9
C1
R12
R11
C8
C11
C11
R13
C2
C4
R5
6K7
A
G
C3
C4
R1
R1
6Q7
6A8
C11
R4
C7
C6
R1
R7
6K7
6F6
C8
SPEAKER PLUG
3
4
1
2
R10
C5
R6
C12
SHIELDED 3 WIRE CABLE
C10
R8
INDICATES CONNECTION TO CHASSIS

ALL-WAVE FARM SET

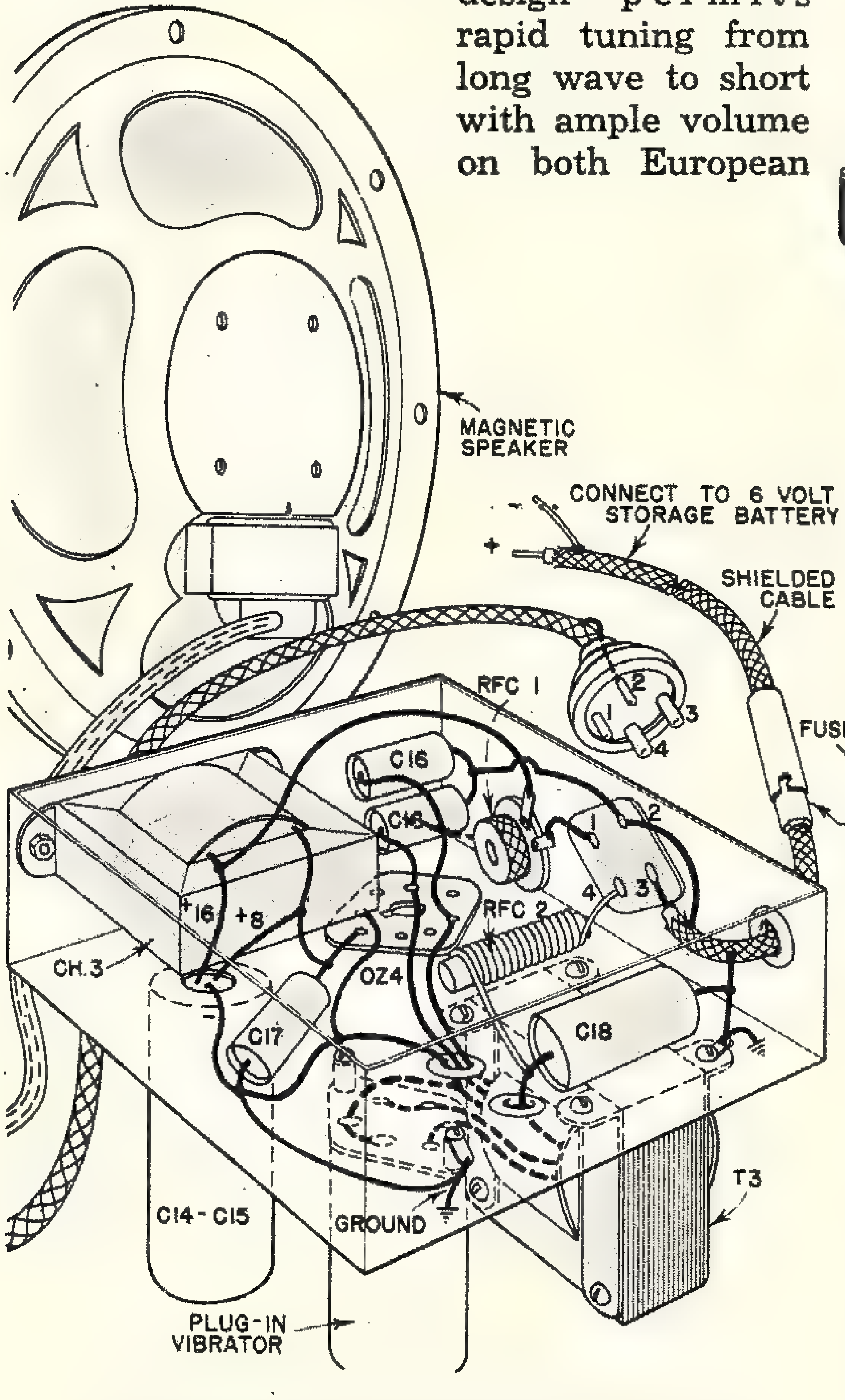
by H. L. Warner

The vibrator device is a unique apparatus that converts 6 or 32-volt direct current into alternating so that it can be increased to any desired voltage by feeding it into a power step-up transformer and rectifying it in the same manner as the current used in electric receivers operating on city current.

In designing this modern all-wave rural receiver only parts which could be obtained at any radio supply house were selected. These were arranged into an ingenious circuit which employs five metal tubes and provides maximum efficiency. A wave switch of simple design permits rapid tuning from long wave to short with ample volume on both European and American broadcasts. In addition to the all-wave tuning this set features a tone control and permanent dynamic speaker, neither of which are found on the obsolete farm set.



Shown in this drawing are the receiver, permanent dynamic speaker and B power unit. Complete set can be installed in a console cabinet.



Converting 6-volt battery current into high voltage, for operating radio, this B power unit completely eliminates use of B and C batteries formerly used.

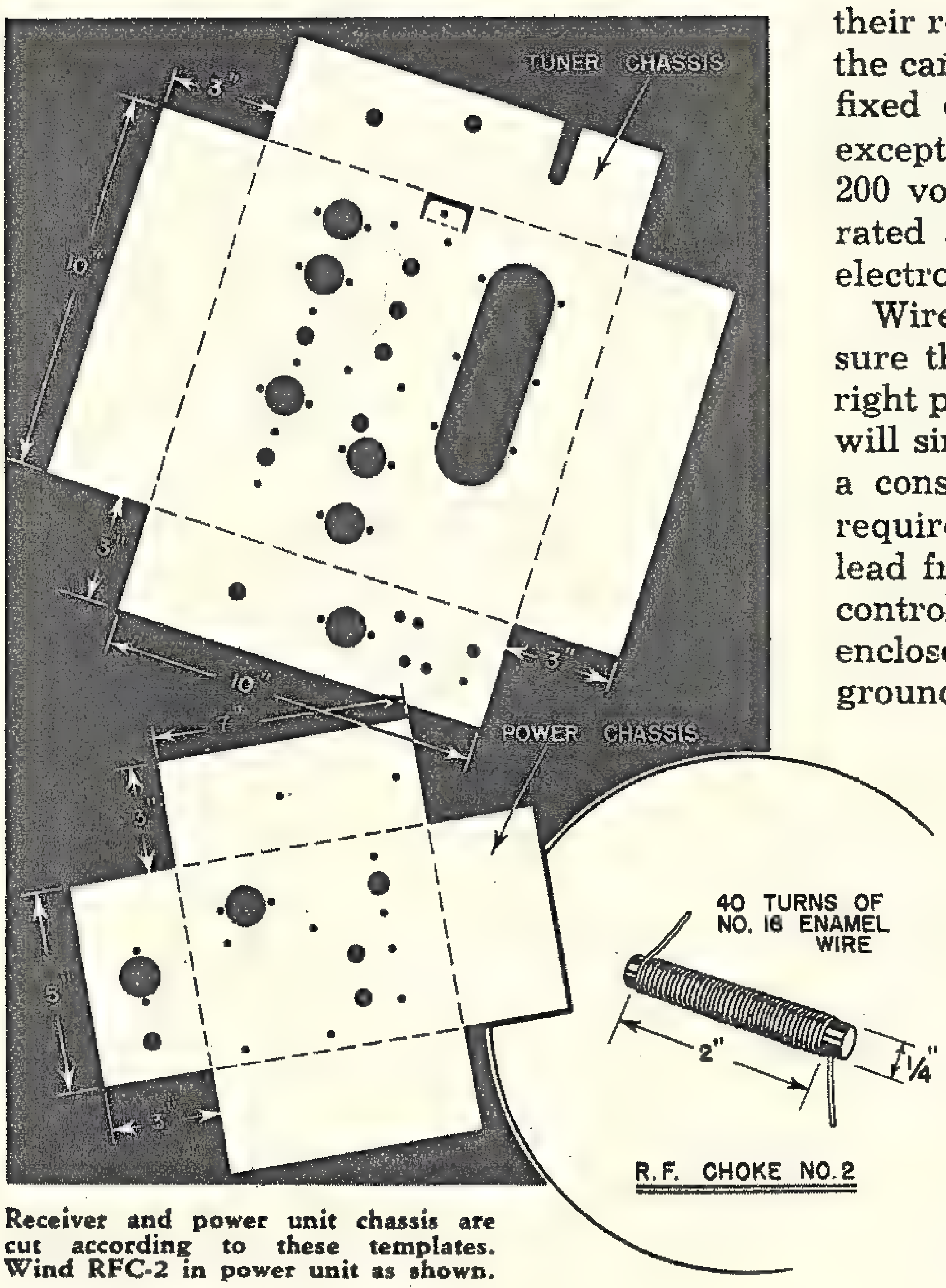
To start actual construction on the set first form the chassis from a sheet of aluminum or electralloy so that when bent to shape it measures 10″ by 10″ by 3″. Before bending the chassis to shape holes for sockets should be cut in the top with a fly cutter using the template diagram as a guide.

With the various holes completed, start assembling the receiver's components in their respective positions inside the chassis. Mount the five octal 8-prong tube sockets first; next the tuning coil assembly, switch inside, coils on top of chassis and last install the 3-gang tuning condenser. All parts are fastened to the chassis with 6/32 brass machine screws and hex nuts to match. Bolt all parts securely so that there is no chance for them to work loose.

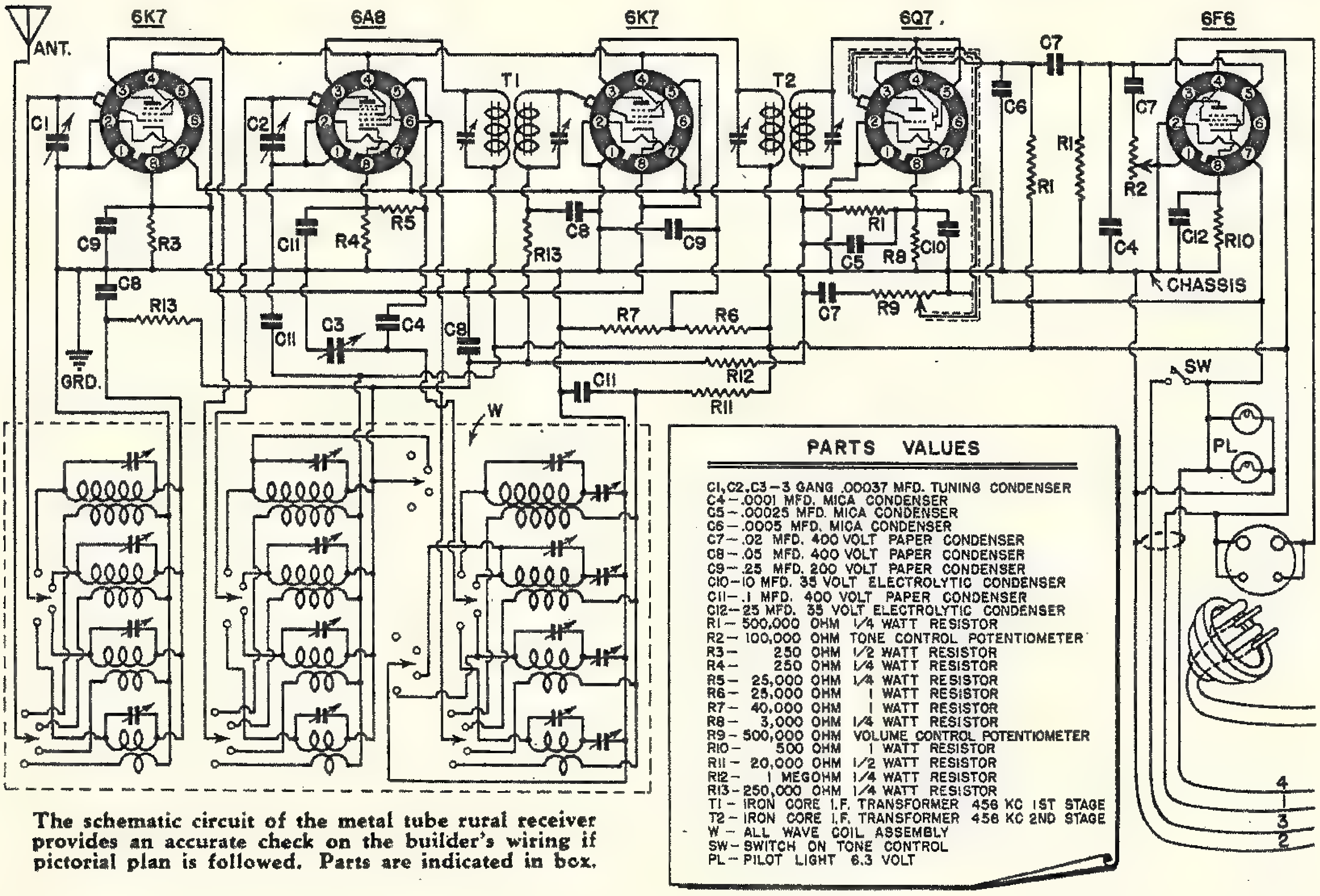
Since all resistors and condensers used in this set are provided with "pigtail" leads a considerable amount of wiring is eliminated by sliding insulating spaghetti tubing over these leads and soldering them directly into their respective places. All resistances are of the carbon type and rated at 1 watt. Tubular fixed condensers are all rated at 400 volts except the two .25 mfd. which are rated at 200 volts and the 10 and 25 mfd. which are rated at 35. The latter two condensers are electrolytics.

Wire up the receiver with care making sure that all connections are soldered to the right places. Following the pictorial diagram will simplify the wiring up of the receiver to a considerable extent. Shielded cables are required in several parts of the circuit. The lead from the center terminal of the volume control to the cap of the 6Q7 tube should be enclosed in a shielded covering and the shield grounded to the receiver chassis. Cables connecting the vibrator power supply to the set are also enclosed in a shield which is grounded to the chassis of set and power supply.

After completing the wiring of the set form the chassis for the B power supply unit and assemble the various parts used in its construction by following the pictorial diagram. Transformer, electrolytic condensers, vibrator and rectifier tube are all standard parts, therefore there will be no difficulty in



Receiver and power unit chassis are cut according to these templates. Wind RFC-2 in power unit as shown.



PARTS VALUES

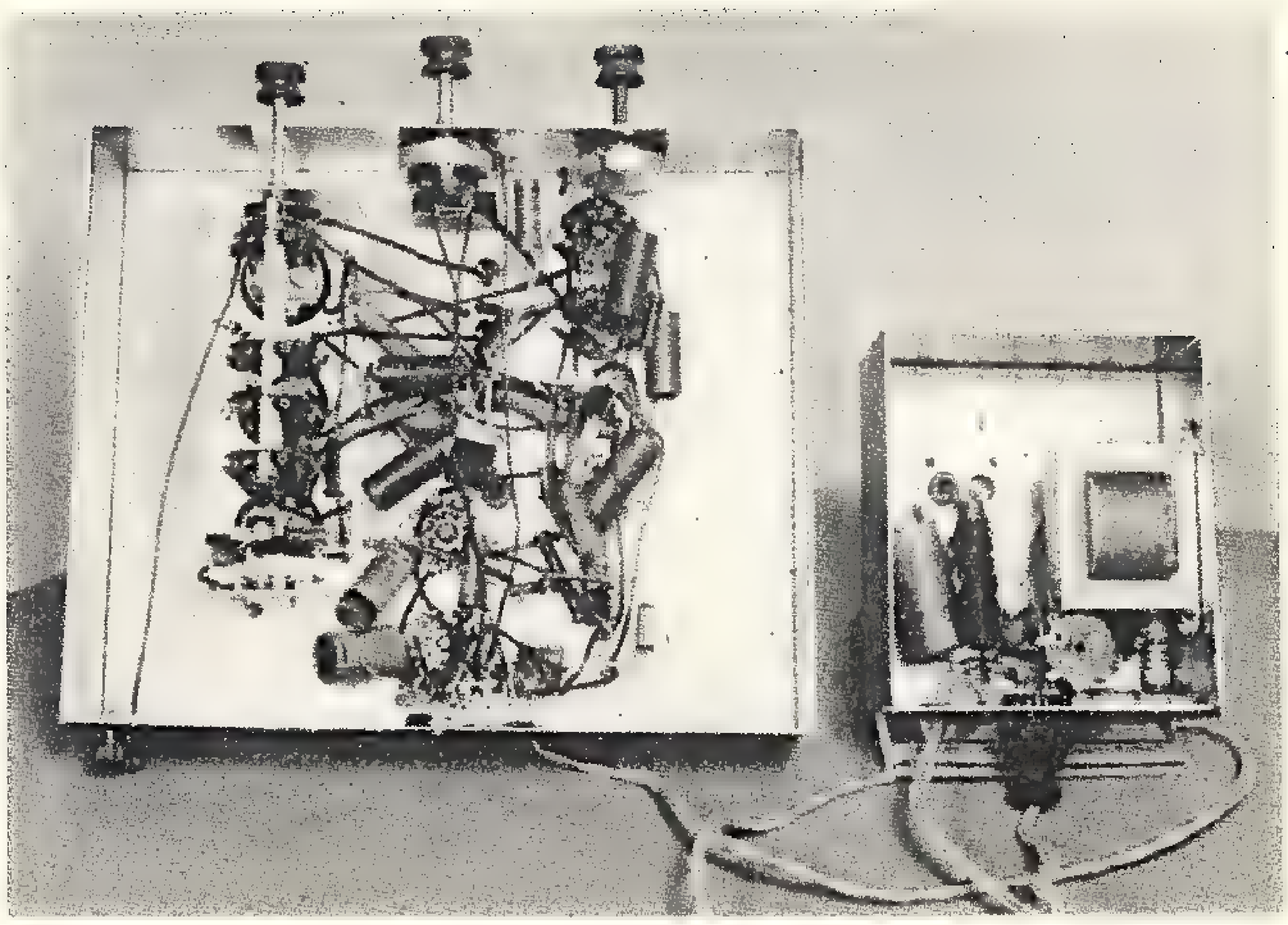
C1,C2,C3—3 GANG .00037 MFD. TUNING CONDENSER
C4—.0001 MFD. MICA CONDENSER
C5—.00025 MFD. MICA CONDENSER
C6—.0005 MFD. MICA CONDENSER
C7—.02 MFD. 400 VOLT PAPER CONDENSER
C8—.05 MFD. 400 VOLT PAPER CONDENSER
C9—.25 MFD. 200 VOLT PAPER CONDENSER
C10—10 MFD. 35 VOLT ELECTROLYTIC CONDENSER
C11—.1 MFD. 400 VOLT PAPER CONDENSER
C12—25 MFD. 35 VOLT ELECTROLYTIC CONDENSER
R1—500,000 OHM 1/4 WATT RESISTOR
R2—100,000 OHM TONE CONTROL POTENTIOMETER
R3— 250 OHM 1/2 WATT RESISTOR
R4— 250 OHM 1/4 WATT RESISTOR
R5— 25,000 OHM 1/4 WATT RESISTOR
R6— 25,000 OHM 1 WATT RESISTOR
R7— 40,000 OHM 1 WATT RESISTOR
R8— 3,000 OHM 1/4 WATT RESISTOR
R9—500,000 OHM VOLUME CONTROL POTENTIOMETER
R10— 500 OHM 1 WATT RESISTOR
R11— 20,000 OHM 1/2 WATT RESISTOR
R12— 1 MEGOHM 1/4 WATT RESISTOR
R13—250,000 OHM 1/4 WATT RESISTOR
T1—IRON CORE I.F. TRANSFORMER 456 KC 1ST STAGE
T2—IRON CORE I.F. TRANSFORMER 456 KC 2ND STAGE
W—ALL WAVE COIL ASSEMBLY
SW—SWITCH ON TONE CONTROL
PL—PILOT LIGHT 6.3 VOLT

The schematic circuit of the metal tube rural receiver provides an accurate check on the builder's wiring if pictorial plan is followed. Parts are indicated in box.

purchasing them. Three tube sockets are mounted on the rectifier chassis for connecting the receiver cable, rectifier tube and vibrator unit.

Mount these parts with machine screws in the same manner as the set components installing lock washers under the hex nuts to prevent parts working loose from the vibration of the transformer and vibrator. After wiring the B power supply connect a shielded battery cable, such as used in automobile receivers and fitted with a built-in fuse, to a six-volt storage battery. Connect the receiver cable plug in the side of the power unit and the all-wave receiver is ready for its first test.

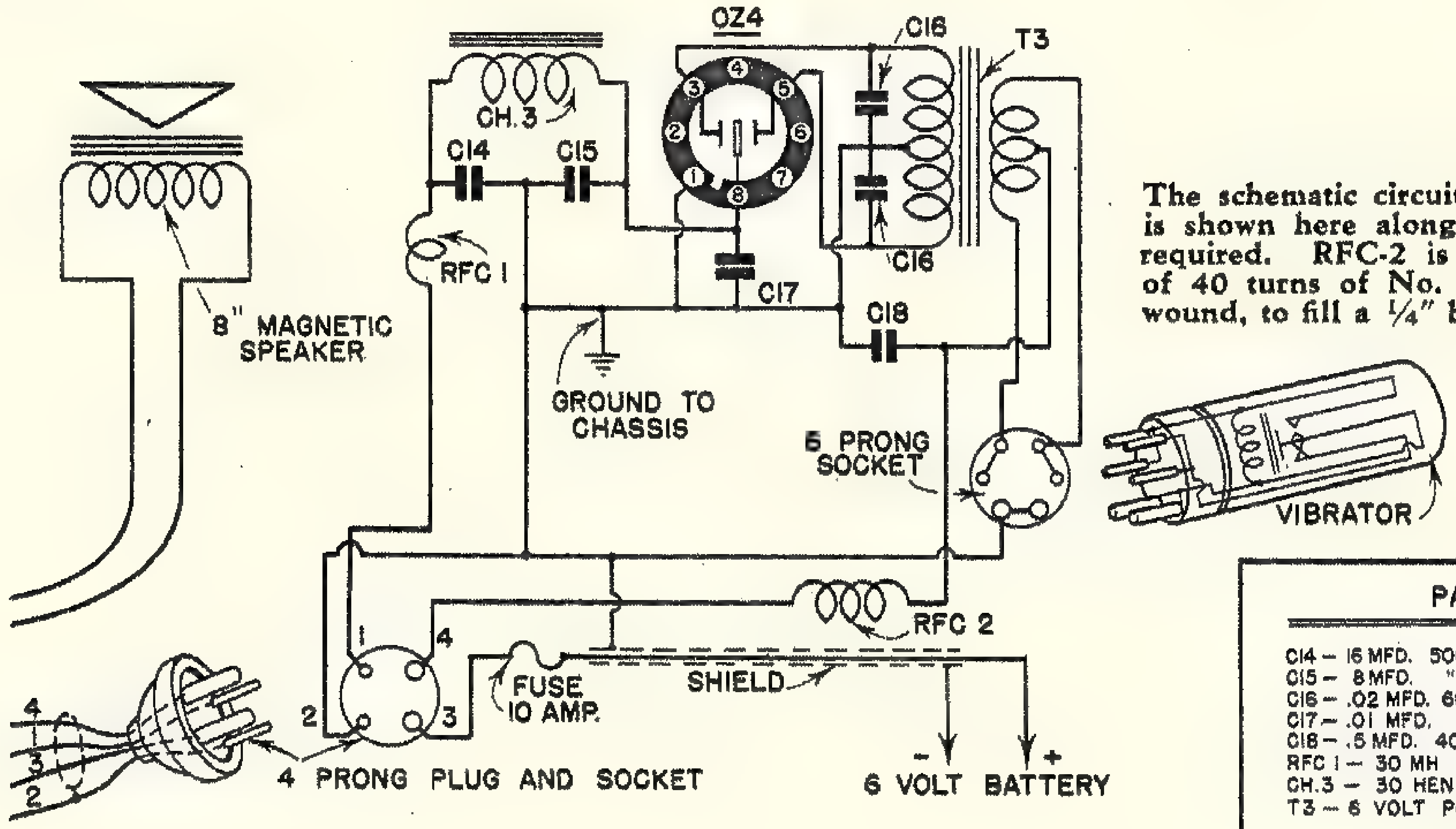
Unless your all-wave coil assembly is supplied with a matched gang condenser it will be necessary to have the completed set balanced with an oscillator. If the builder does not own this instrument he can have the work done by a local radio serviceman at a small charge. After the receiver has been balanced correctly it is ready for use. Connect an antenna of not more than 75 feet in length to the antenna post and a good ground connection to the ground post. The tubes will require a few seconds to heat up before reception can be obtained after which either broadcast, police or foreign stations can be tuned in with a single dial control and the snap of a switch. The tone control permits the permanent dynamic speaker to respond to all tone ranges just like any other modern receiver.



The simplicity of the wiring up of the receiver is indicated in this photograph showing a bottom view of the all-wave receiver and B vibrator power unit.

Although only five tubes are employed in the circuit of this receiver their modern construction and high efficiency results in more than enough volume for home requirements. In many localities powerful European stations can be tuned-in with the volume of local broadcasters. Interesting police, airplane and amateur broadcasts can be tuned in at any time to provide new thrills in radio reception.

The finished set can be installed in a console cabinet making it an attractive decoration and luxury for any rural home. The set can be operated at no cost by attaching a windcharger to the storage battery. Plans for building an efficient windcharger plant are available from Modern Mechanix Blueprint Dept., Greenwich, Conn., at 50c.

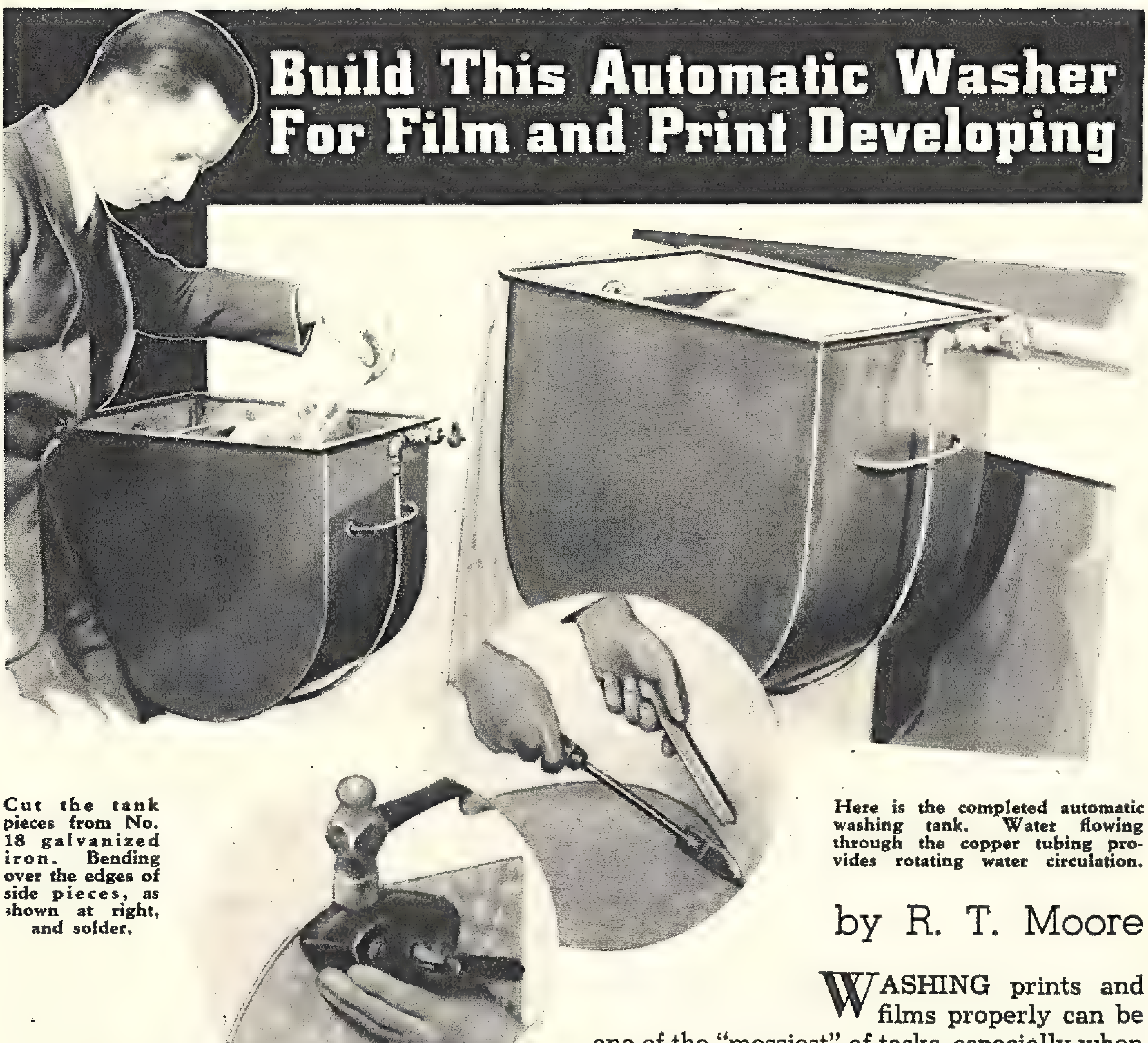


The schematic circuit of the B power supply is shown here along with a list of materials required. RFC-2 is homemade and consists of 40 turns of No. 16 enameled wire, layer wound, to fill a 1/4" by 2" spool or fiber tube.

PARTS VALUES

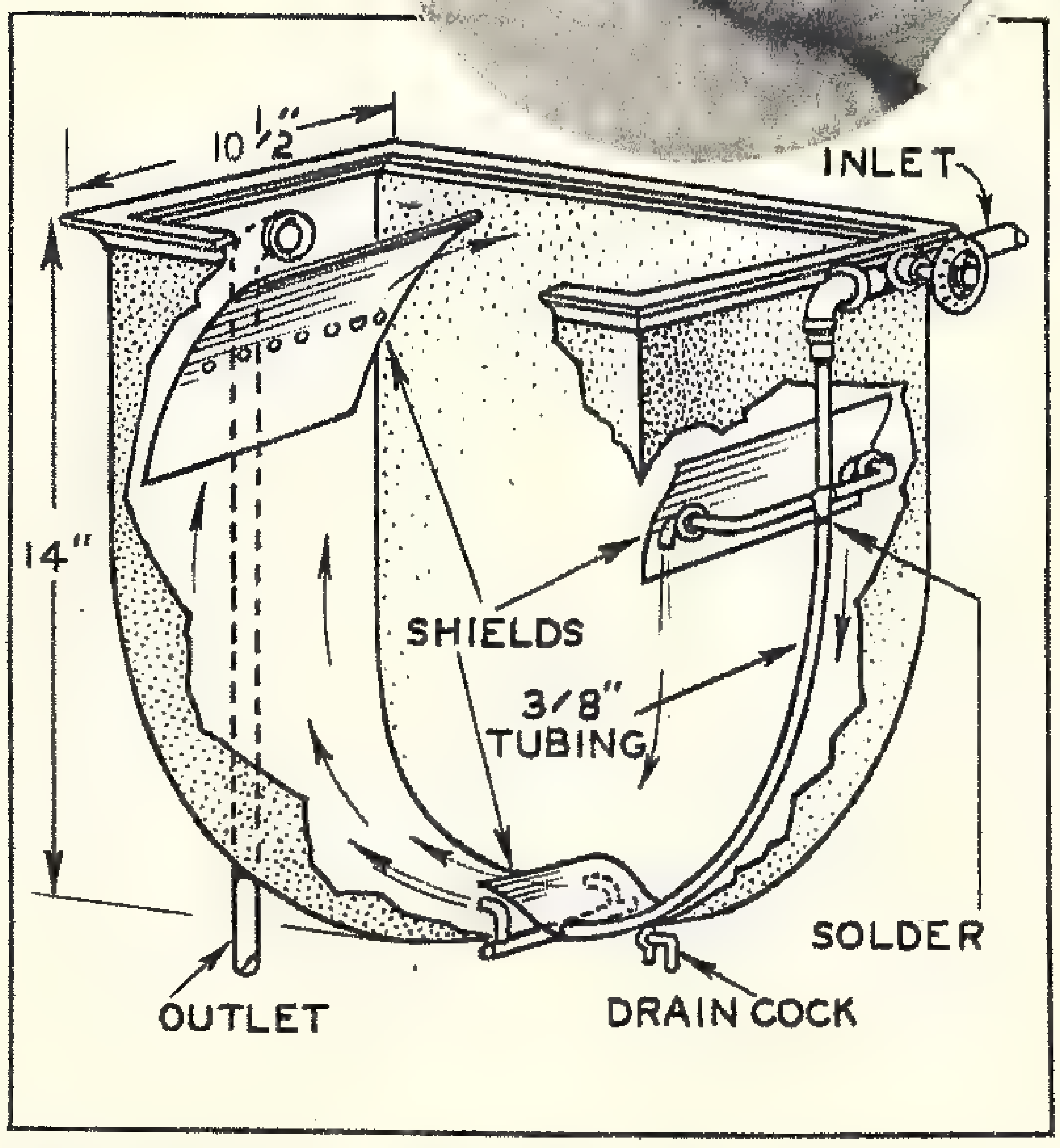
CI4 — 16 MFD. 500 VOLT ELECTROLYTIC CONDENSER
CI5 — 8 MFD. " " " "
CI6 — .02 MFD. 600 VOLT PAPER CONDENSER
CI7 — .01 MFD. " " " "
CI8 — .5 MFD. 400 VOLT " "
RFC 1 — 30 MH CHOKE
CH.3 — 30 HENRY FILTER CHOKE
T3 — 6 VOLT POWER TRANSFORMER

Build This Automatic Washer For Film and Print Developing



Cut the tank pieces from No. 18 galvanized iron. Bending over the edges of side pieces, as shown at right, and solder.

Here is the completed automatic washing tank. Water flowing through the copper tubing provides rotating water circulation.



This perspective diagram shows the construction of the washing tank. Galvanized iron is used for the tank construction. Metal flaps over the inlet pipes act as deflectors so that the prints revolve freely.

by R. T. Moore

WASHING prints and films properly can be one of the "messiest" of tasks, especially when you have a great many to make at a time, but with the proper facility this becomes no task at all and proper washing is assured. The washer shown here is easy to construct and its entire cost should not exceed two dollars.

First, two pieces of heavy galvanized iron 14¼" long, 14⅛" wide are required for the sides and one piece 9" wide and 35" long is required for the ends and bottom. Lay out the largest semi-circle possible on the sides and cut these out with curved tin snips. Mark out a ⅛" margin around these pieces and using a flat iron and a hammer form a rim around these pieces. Now shape the long piece inside of this rim around one of the sides and solder it in place, spot it in place first, then solder both inside and out. Solder the other side piece in place in similar fashion. Form four angles from *DOUBLE* galvanized as shown, two of these 14" long and two 10½" long and solder to the top of the tank.

A piece of ¼" copper tubing about 12" long

[*Continued on page* 124]

attention on various fishing vests and jackets. Those without arms give one the best of free arm movement. When furnished in lightweight material, even suede cloth or the lightest flexible leather, they are something to think twice about before dismissing once. Such fishing vests have pockets for the dry fly oil, for the leader box, for the pipe and tobacco and other small items. Where a vest or coat is stiff in material all these knick-knacks cluster one up. They are not so keenly felt in the vest or coat that comes in a soft, flexible material.

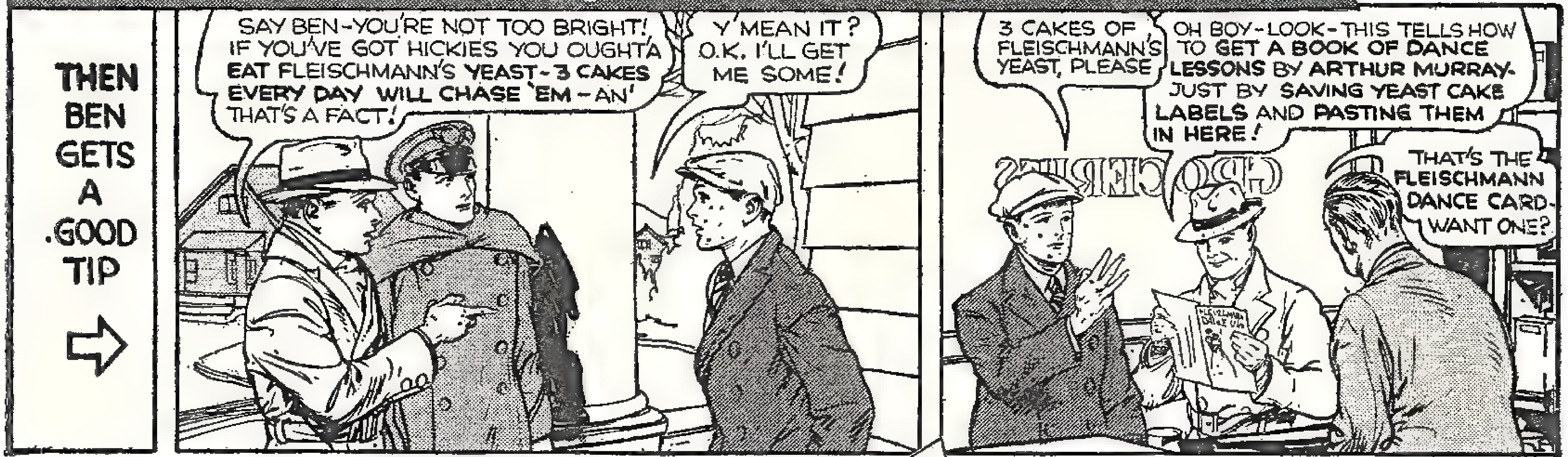
As to whether a cap or a hat is to be used depends much upon the fisherman. A cap offers but little protection against the rain, while a hat sheds the same with comparative ease. A soft felt hat with a drop brim is probably the best of all. The eyes are really properly shaded under a brim of the sort, affording one the opportunity of observing the movements of the fly or the activities on the stream with ease and clearness. Some fishermen are in the habit of taking along a sou'wester to be used on the head in case of rain. It is not a bad idea. Fitted out with a rain cape or pull-over and a sou'wester one can fish right on through the rain. The fact that some of the finest trout come into action when it rains, knowing, as they do, that insects, worms, etc. are washed into the stream, to fish at such times is one of the safest rules to follow.

While it is possible to carry the trout you catch in a flour sack at your belt or thrust the same away in the back of your hunting coat, the fact remains that a creel is really a blessing of no mean order. The regulation type willow creel answers to the purpose, and is to be desired as against the type of canvas creel sometimes used. The latter has very little to recommend it, and has but little sale. Do not buy a creel that is too small. The 15 or 20-pound size is about as small as one should go. They may be had either plain or brown stained and leather bound, splendid looking affairs. The latter is recommended. They cost a trifle more, but are worth it. Some creels are fitted out with bait boxes on their cover, and a lift lid revealing a compartment where flies, spinners and leaders may be lodged. Such creels are an absolute boon.

A short-handled landing net is the usual requirement in average trout fishing. The collapsible type of net, which may be knocked down and put up in a canvas slip when transported, is a recommendation. To the tip of the handle of this net an elastic cord is connected, making it possible to throw the same over the shoulder and stretch the same to round in the fish. Where one is fishing a large stream and large trout are likely to be met with, the same type of net with a two-foot handle is a recommendation. A net of the sort

[*Continued on page* 128]

AT ONCE to Clear Your Skin! Dance Smartly! *BE POPULAR!*


THEN BEN GETS A GOOD TIP
SAY BEN-YOU'RE NOT TOO BRIGHT! IF YOU'VE GOT HICKIES YOU OUGHTA EAT FLEISCHMANN'S YEAST-3 CAKES EVERY DAY WILL CHASE 'EM-AN' THAT'S A FACT!
Y'MEAN IT? O.K. I'LL GET ME SOME!
3 CAKES OF FLEISCHMANN'S YEAST, PLEASE
OH BOY-LOOK-THIS TELLS HOW TO GET A BOOK OF DANCE LESSONS BY ARTHUR MURRAY-JUST BY SAVING YEAST CAKE LABELS AND PASTING THEM IN HERE!
THAT'S THE FLEISCHMANN DANCE CARD-WANT ONE?
GROCERIES

GET THIS FREE FLEISCHMANN DANCE CARD FROM YOUR GROCER TODAY!

Boys! Girls! Here's how you can get a copy of ARTHUR MURRAY'S exciting dance book!

It is NOT FOR SALE. The *only way* to get your copy is with Fleischmann Yeast labels! Paste these on FREE Fleischmann Dance Card your grocer will give you. Send it in. *If your grocer has no Dance Cards,* you can get the book by pasting the 81 labels on paper, or putting them in an envelope, and sending with *your name* and *address* to Fleischmann's Yeast, 701 Washington St., N. Y. C. (This offer holds good until August 31st, 1937.)

(Details of securing Dance Book differ slightly in states West of Denver and in Canada, see newspapers or ask your local grocer.)

FLEISCHMANN DANCE CARD
FLEISCHMANN'S YEAST

Dr. R. E. Lee, well-known physician, says: "Eat **Fleischmann's Yeast** if you want to help clear up **ADOLESCENT PIMPLES.**"

● During adolescence important glands develop. The whole body is disturbed. The skin gets oversensitive. Waste poisons in the blood irritate this sensitive skin—pimples break out! Fleischmann's Yeast helps to clear up pimples by clearing these skin irritants out of the blood. Eat *3 cakes daily*—plain, or in water—about ½ hour before meals.

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[*Continued from page* 76]

mishap. There were only a few passengers on deck. There had been no boat drill since the vessel had sailed; had there been, it would have revealed the amazing and terrible fact that there were only 16 boats with a total capacity of 53 per cent of those on board. None of the passengers seemed to be aware of the boat shortage.

Several books by survivors tell in detail what happened about the decks and in the boats. The men stood back quietly; the unanimous reports of credible survivors, officers as well as passengers, were that discipline was kept. Despite sensational yarns to the contrary, there was no panic, no rushes for the boats, or "harrowing scenes." The men stepped aside and calmly conversed or smoked. One of the many tragic phases of this great disaster is that most of the first boats went away half loaded. Officers could not induce the women to leave in them! Most of the women refused point blank to enter the boats. "Leave their menfolk?"—leave the big, safe, and warm ship—get into those frail boats and make the long and apparently perilous descent to the cold Atlantic? "Well, hardly!" Some even stopped to question the officers, or to argue with them. Others, like the elderly Mrs. Straus, refused to leave their husbands.

There were numerous instances of heroic restraint and of chivalrous conduct on the part of the men. That only five first class women and children were lost speaks eloquently enough for the magnificent discipline of the first and second class men.

No. 7 was the first boat to be lowered. It went over at 12:45 a. m. with only 27 people—its capacity was 65. No. 1 pulled away with 12; it could have held 40. When some boats ran short of women, men were put in; but when other women appeared, they immediately got out again. Colonel John Jacob Astor placed his young bride in a boat and stepped back to rejoin the men. He lit a cigarette. Colonel Astor went down, his bride lived. Wealth, social position, or public prominence did not count. Men in the world of arts and affairs stood back; an elderly German immigrant woman, a slip of a girl, or a child, stepped into the boat. Sex and age were the sole determinants. There were a number of page and elevator boys who, as juveniles, could have entered the boats; they never approached them—they were men, and members of the crew!

Even with the lowering of the boats most of the passengers thought there could be very little likelihood of the *Titanic* foundering. They regarded the launching and sending away of the boats only as a safety precaution. A passenger who had smashed in a jammed door to release an imprisoned man, was warned by an outraged steward, who came up at that moment, that his damage to company property would mean his arrest when the ship docked at New York!

Word came at 12:33 a. m. that the *Carpathia* was on the way and would arrive in four hours. This, too, helped to allay anxiety over the ship's condition. At this time the eight immortal musicians took their places on the promenade deck and began playing rag-time music. They played lively tunes until a few minutes before the end. Their last piece was "Autumn," a Church of England hymn, and not "Nearer, My God to Thee" as has been reported. Not one of the musicians was saved; their heroism is perpetuated by a memorial tablet in the Public Library at Southampton, England.

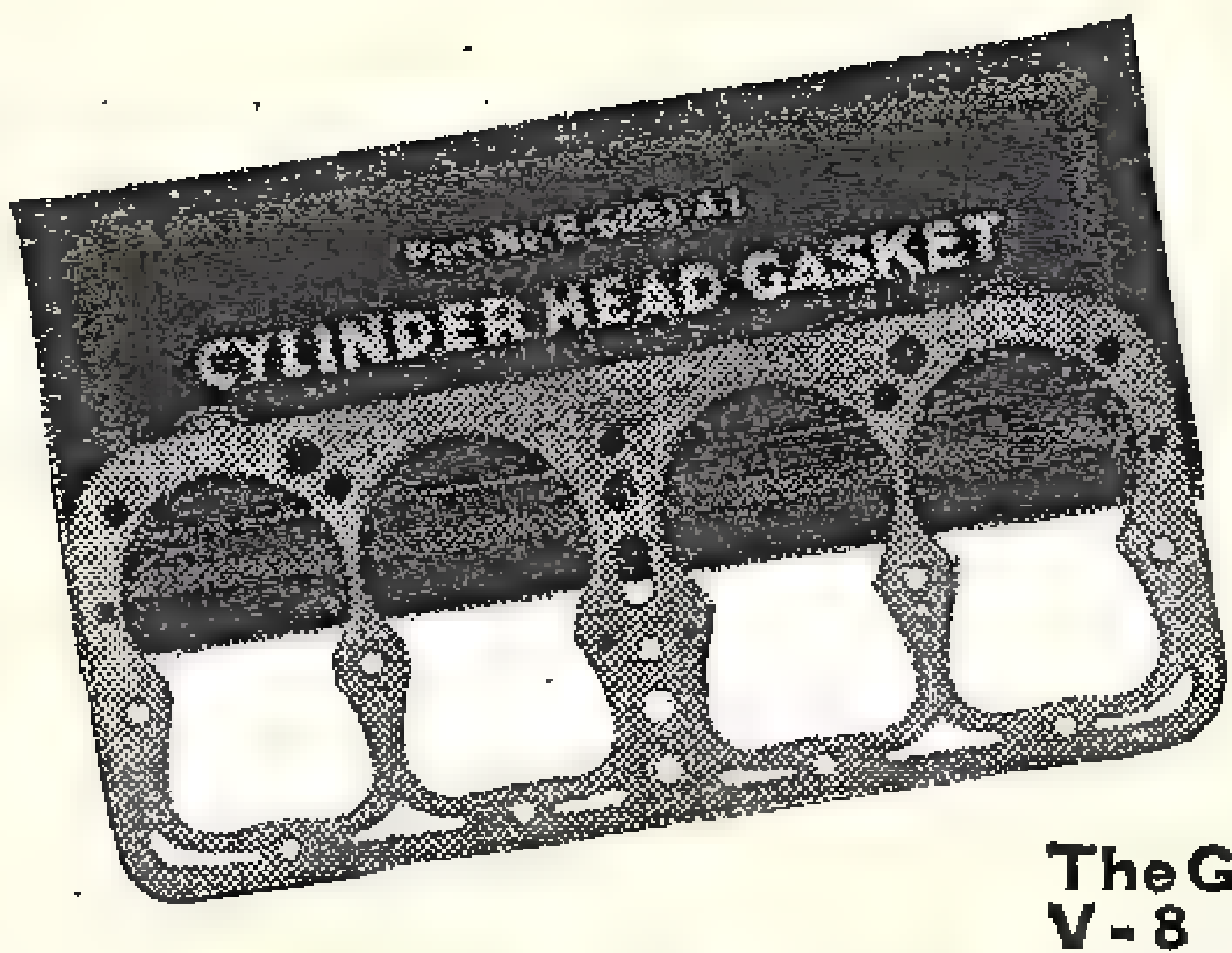
Three American and two British mail clerks carried every sack of their registered mail up from the flooded mail room to an upper deck. They might have spared themselves the labor of dragging more than 200 heavy sacks of mail up several decks; not a sack of it was saved. The clerks were last seen standing guard over their mail. Like the engineers and the musicians, they perished to a man.

Most of the fires in the forward boiler rooms were drawn by midnight. The two forward compartments were then completely flooded. The engineers switched in emergency dynamos, well above the water line, for lights, pumps, and the wireless. All engineers, including those off watch and a number of non-marine guarantee men making the trip to observe the new apparatus, were below. Not one was ever seen on deck. They dragged great sections of piping through rapidly filling compartments to forward boiler rooms, vainly attempting to keep down the rising tide. They pumped out thousands of tons of water; their efforts undoubtedly prolonged the life of the ship. One hundred and twenty-two feet below the boat-deck, far below the water line, totally ignorant of what was going on above them, they carried on, knowing that their chances of escape from the depths of their steel compartments would be exceedingly remote. They had no false hopes to buoy them, nor could they be ignorant of the ship's actual condition and waning life.

At 1:40 a. m. the firemen were ordered out, but the engineers stayed. Andrews, the builder, Bell, the chief engineer and 35 licensed engineers toiled on. While they worked there would be lights for the more fortunate ones up on the boat deck and there would be power for the wireless. Every ton of water they were able to pump back overboard prolonged the life of the *Titanic* a little; it permitted others to get away in the boats; they might even keep her afloat until a rescuer arrived. Not one of these men were saved.

A beautiful and inspiring monument in Southampton immortalizes their deathless heroism. Andrews was last seen helping an aged deck steward lash together deck chairs and throw

[*Continued on page* 120]



The Genuine Ford V-8 Gasket is packaged for your protection.

PRESSURE—600 lbs. per sq. in.! TEMPERATURE—3000 degrees! . . . but FORD GASKETS are built to take it

Each explosion inside a Ford V-8 combustion chamber may exert a pressure of as much as 600 pounds per square inch. The flames from the burning gases reach temperatures as high as 3000 degrees. At such temperatures and pressures, a lot depends upon gaskets. They must keep these hot gases from leaking into the water jackets. They must keep the jacket water from entering the combustion chambers. They must provide as effective a seal between head and block as the metal of these parts themselves.

Genuine Ford Cylinder Head Gaskets are built to give long, dependable service under these severe conditions. A steel core is permanently bonded between two thicknesses of specially treated asbestos that resists the effects of water, gasoline and oil. Combustion chamber openings are reinforced with a steel edging for protection against blowing out. And correct compression in the cylinder heads is assured because Genuine Ford V-8 Cylinder Head Gaskets compress to the correct thickness (.048 to .051 inch).

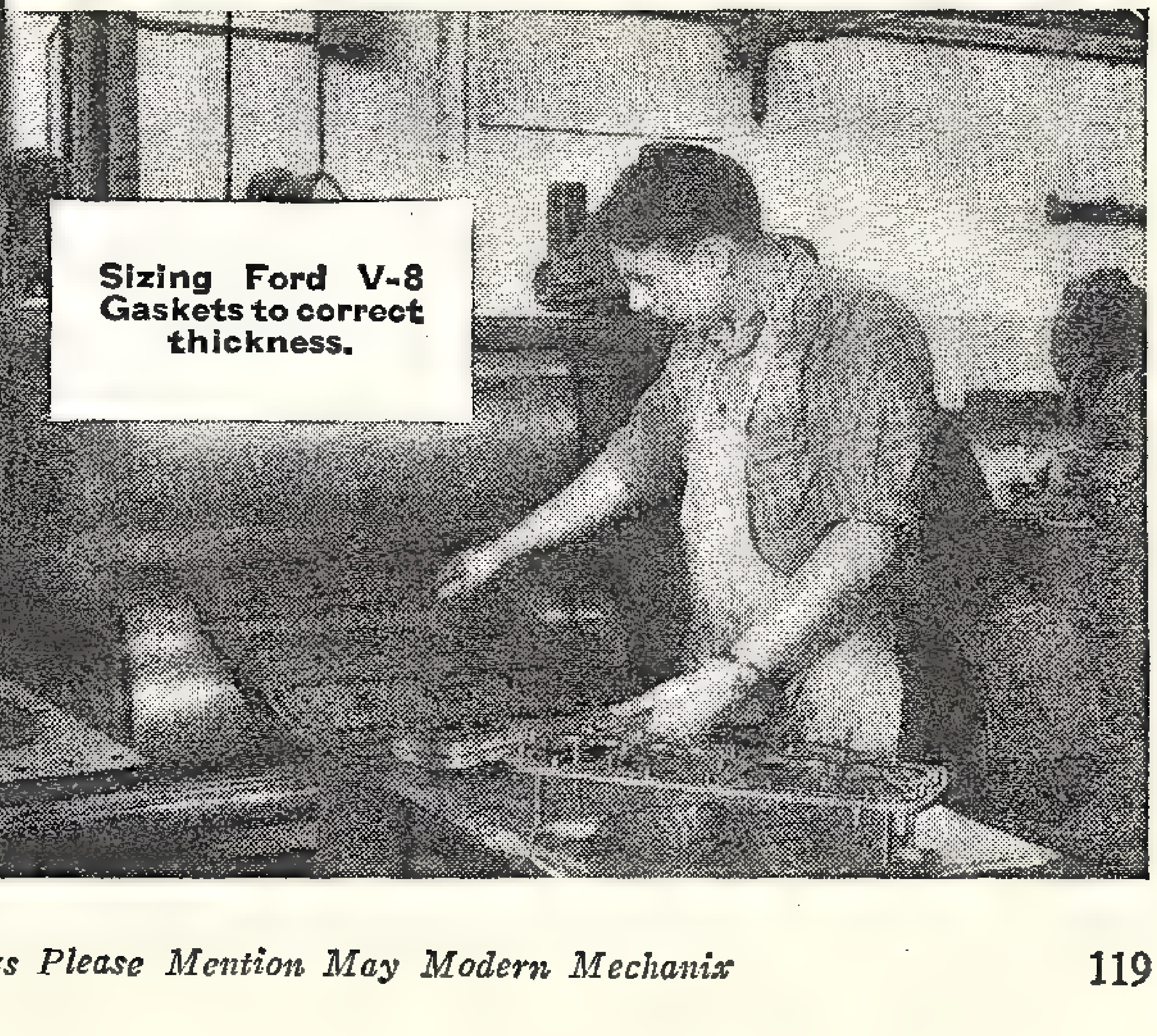
As with all Genuine Ford Parts, Ford Gaskets are made of the highest quality materials. Insist upon Genuine Ford Parts when replacements are needed.

GENUINE Ford PARTS

FORD MOTOR COMPANY, DEARBORN, MICHIGAN

These rolls clinch the two asbestos sheets to steel core.

Putting grommets on combustion chamber openings, Ford V-8 Gaskets.



Sizing Ford V-8 Gaskets to correct thickness.

"Ifs" Of The Titanic Tragedy

[*Continued from page* 118]

them overboard in the hope that they might save some struggling victim in the water when the ship went down. The great vessel he had created was dying; the pride of his life's work would never reach her first port; there was nothing more that he could do even to lengthen her last few moments; still there was work to do, lives must be saved, and so Andrews, builder of the *Titanic,* busied himself to the end.

After Captain Smith had told the radiomen that the *Titanic* could not last more than a half hour, Bride had gone to their adjoining room and got their money, clothes, and lifebelts. Both dressed as warmly as they could. Phillips returned to his key and sent another SOS. At this point, Captain Smith came in for the last time and said:

"Men, you have done your full duty; you can do no more. Abandon your post. Now it is every man for himself."

With a 46,000-ton ship sinking under his feet and with 1,500 human beings still unprovided for, Smith remained a calm and noble figure to the end. All through this disaster one stands impressed by the magnificent discipline and the orderly procedure which adds glory to the sorrow of this tragedy.

Phillips continued working another 10 to 15 minutes. With a steady, unhurried hand, he was answering the operator of the *Olympic,* who advised him, "Lighting up all possible boilers as fast as we can." In a quiet voice he asked Bride if all the boats were gone. Bride went out on deck— the last boat had left a half hour before. The sea was lapping over the forward end of the boat deck, normally 60 feet above the water line. He rushed back to the radio room and shouted to Phillips, "Let's clear out!"

Phillips sent his last message: "Come quick, our engine room flooded up to the boilers!" It was two o'clock. They had prepared candles and were ready to shift to their emergency transmitter if necessary. But they had full power and lights to the end.

Bride says that he saw Phillips walk aft across the tilting deck toward the unsubmerged, high, after end of the ship. It was the last he saw of his chief. On top of the Marconi house some men were struggling to get a collapsible boat over.

"They were having an awful time. It was the last raft left. I looked at it longingly for a few moments, then I gave a hand, and over she went. She landed in the water upside down. It was not much of a drop into the water, the icy Atlantic was already swishing over the very top deck forward."

Bride clung to the boat for what seemed three-quarters of an hour until a friendly hand pulled him aboard. This was the same raft which saved Colonel Gracie, who survived the disaster only a few months.

The giant ship sank lower and lower by the head until she stood almost perpendicular to the water, her stern and propellers high out of the sea. Still all the lights burned brightly. The forward stack fell over, creating the erroneous impression, to huddled survivors in the boats, that she had broken in two. The lights went out with dramatic suddenness, flashed on again for a second and then went out forever.

Still that great, monstrous, black finger of steel pointed straight up into the starry sky. Then across the quiet water those shivering in the boats heard a tremendous roar, a hellish din, as everything within the ship, including the heavy machinery, torn loose from its beds, crashed downward through the bulkheads toward the submerged bow. The roar lasted for several seconds and was followed by deep silence. The *Titanic* was then perpendicular to the water; gently and almost imperceptibly she slid into the depths. There was no appreciable suction and hardly any surface wash. The "unsinkable" ship was gone. The time was 2:20 a. m., April 15, 1912.

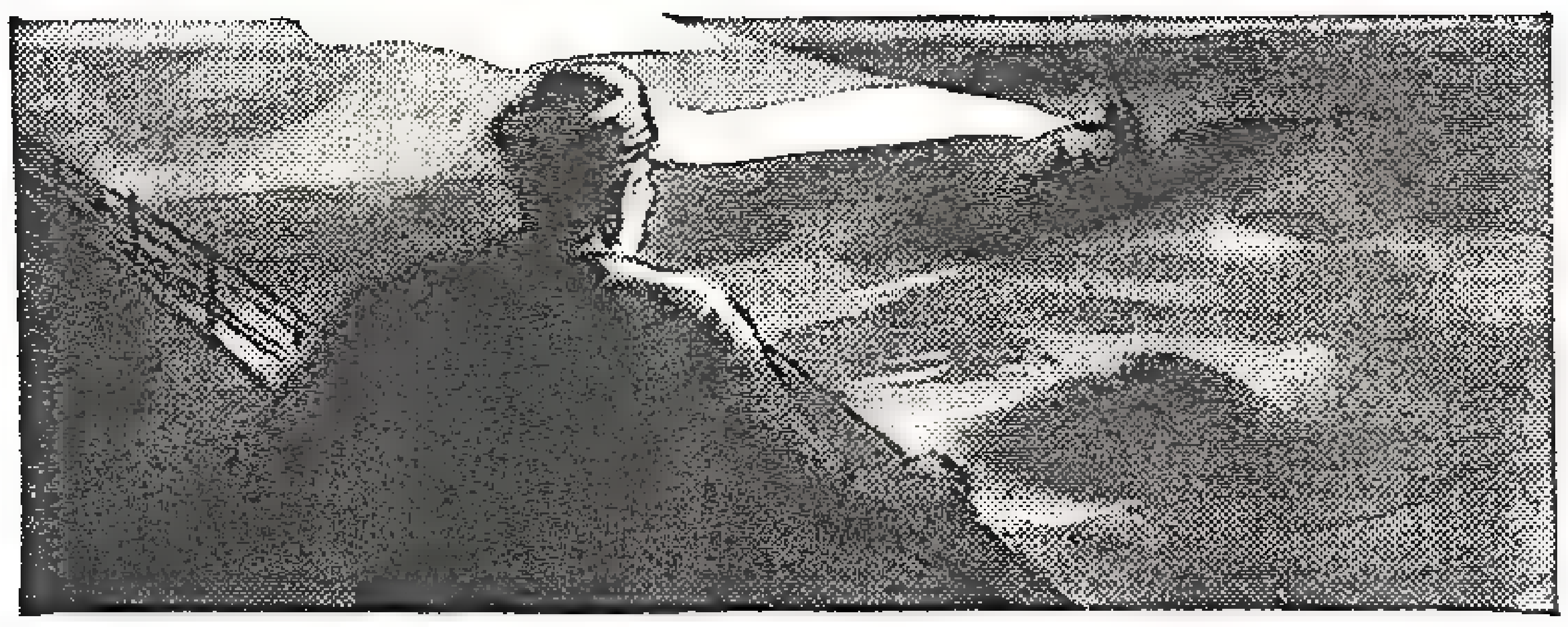
Then followed the most gruesome scene of the tragedy. Hundreds of voices: men, women and children in the agony of death in the icy waters, were crying piteously for help that was not to be had. Cruelly the cold, the distant stars, and the silent black sky threw back their hopeless pleas. Those in the boats were horror-struck; it had never occurred to anyone that there were insufficient boats or that a single person would be left on the ship. They heard but dared not help. Most of the half-empty boats were too far away; those nearby were loaded to the limits of safety; to venture among the struggling hundreds in the water would be suicidal. The occupants of the boats were stupefied; cold and frightened. So haunting and harrowing were the cries that some of the boats rowed farther away to escape the ghastly screams or they, the living, tried to sing to drown them! The last despairing cries died away 40 minutes after the disappearance of the *Titanic;* the intense cold of the ice-chilled water had killed them.

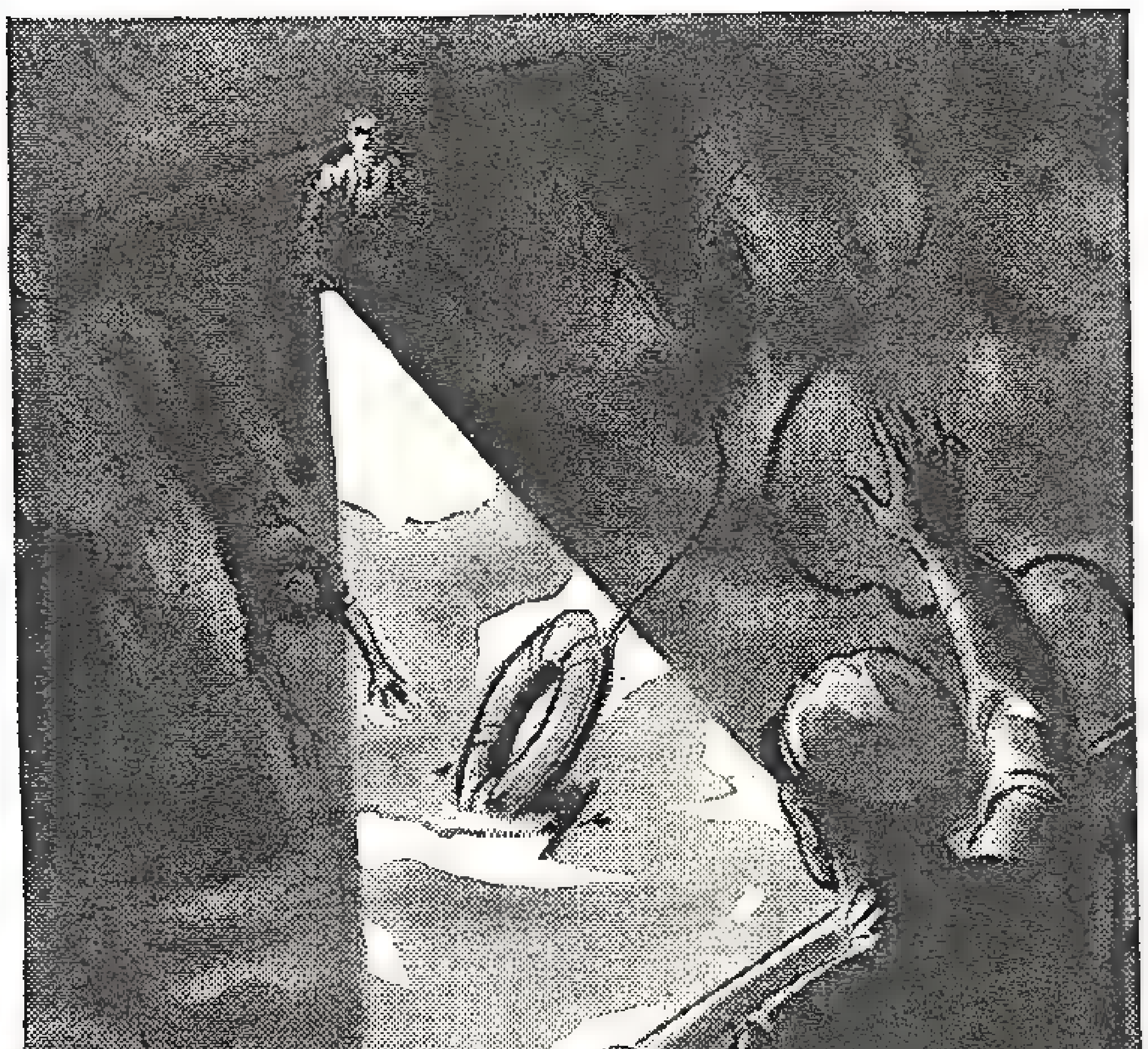
Several days later a "morgue ship" cruising over the Banks, picked up several hundred bodies, only one of which showed signs of having been drowned. The life-jackets, which held them up and made them look like flocks of white gulls at rest on the sea, had saved them from drowning, to die of exposure. They had all died of the cold. Not one, it must be added, was found with any bullet wound, giving lie to sensation mongers. There had been no "rushes by fear-crazed immigrants," or "officers firing into frenzied mobs." Likewise there was no truth in the report that Chief Officer Murdoch had committed suicide.

While boat after boat had been lowered with first and second class passengers, the third class passengers, largely immigrant, separated by many

[*Continued on page* 122]

Out of the Gale Came Cries of Men





Fishermen Blown to Sea in Sinking Boat Saved as Mate Checks Strange Light

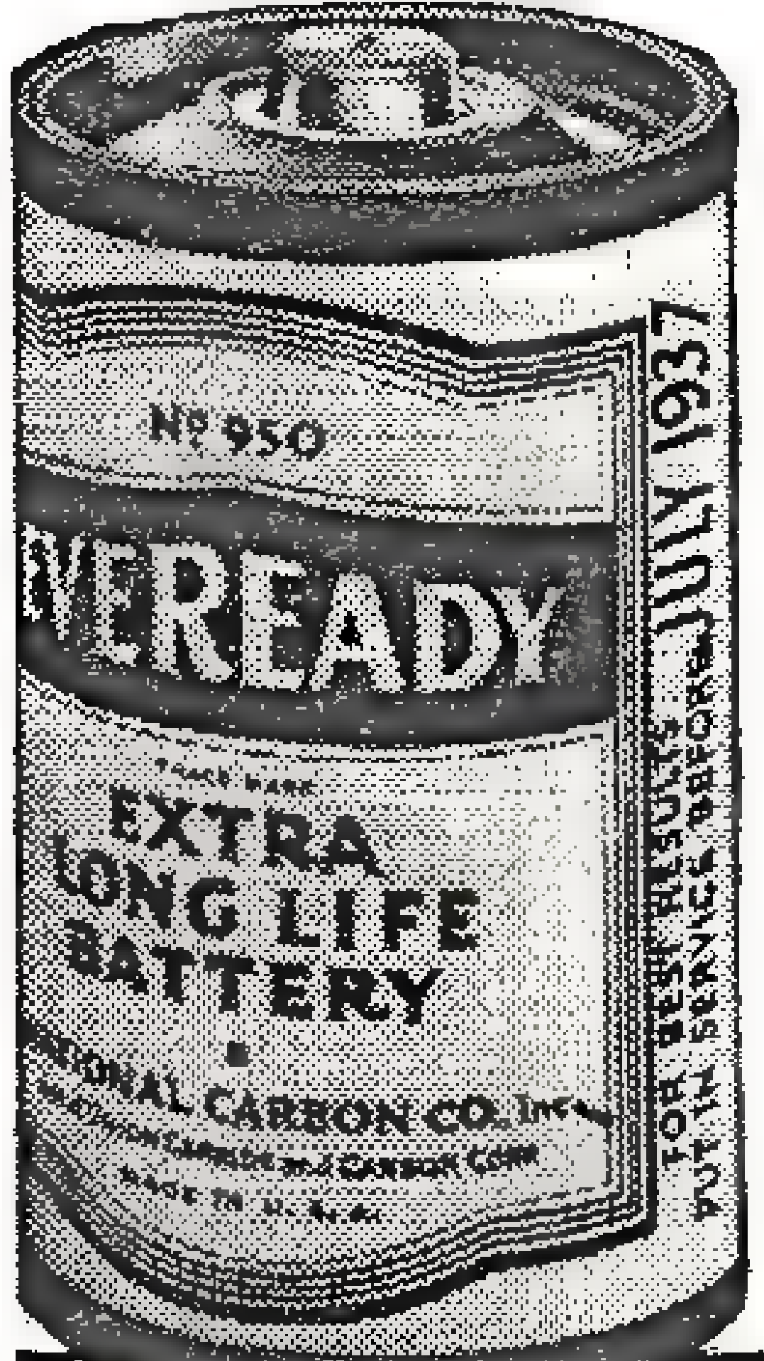
"Two days and two nights we were out there drifting helpless in the gale, and all the while we pumped to keep afloat," write William Neher of New York and Warren Brown of Beverly, Mass.

"Time and again we'd sight a ship during the day, but couldn't make them see us. They'd go on by...leaving us to pump again...and put off drowning a little longer.

"But the second night, we figure our pumping is about over, our hands are so swollen we can hardly grip the pump handle, our backs ache like toothache, and we're beginning not to care much, when way off come the pin points of steamer lights. For hours, as those lights came nearer we signalled with our flashlight and when there was a chance of hearing us through the gale, we yelled like wild Indians.

"We owe our lives to Third Mate Charles Guy of this ship, the Tanker A. S. Hansen of the Sabine Transportation Co., Inc., and to the *fresh* DATED 'Eveready' batteries in our flashlight. For it was the light that attracted Mr. Guy, and made him change his course. Soaked by the storm, in use hour after hour, those DATED 'Eveready' batteries lived up to their reputation. If they hadn't we'd be down below there now with Davy Jones.

(*Signed*) W. Neher.
Warren S Brown"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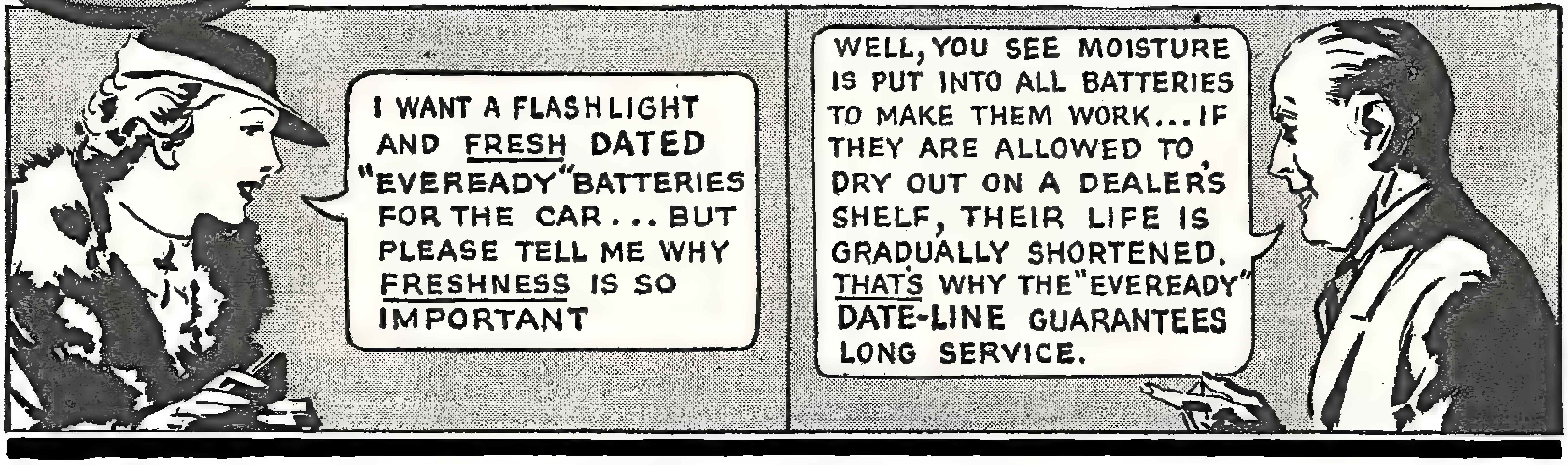
I WANT A FLASHLIGHT AND FRESH DATED "EVEREADY" BATTERIES FOR THE CAR... BUT PLEASE TELL ME WHY FRESHNESS IS SO IMPORTANT
WELL, YOU SEE MOISTURE IS PUT INTO ALL BATTERIES TO MAKE THEM WORK... IF THEY ARE ALLOWED TO DRY OUT ON A DEALER'S SHELF, THEIR LIFE IS GRADUALLY SHORTENED. THAT'S WHY THE "EVEREADY" DATE-LINE GUARANTEES LONG SERVICE.

NEW Xpert .22's For GREATER ACCURACY

Here's a new cartridge for all-around use and target shooting! MORE ACCURATE than ordinary .22's yet NO HIGHER IN PRICE!..Western XPERT .22 Long Rifle is built of same components as SUPER-MATCH, the sensation of 1936! . . . XPERT .22's are available also in Shorts and Longs. SMOKELESS! NON-CORROSIVE! Lead lubricated bullets! Ask your dealer to stock XPERT .22's! Mail Coupon!

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Send, FREE, the new Western Ammunition Handbook—a complete guide to modern shooting that tells all about the new Xpert .22's.

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Full size, heavy duty Aladdin Electric ARC WELDER only $39.25 with De Luxe Accessories! Has efficiency of machines costing $145 to $800. Welds all metals and alloys from heavy motor block and castings to fenders and light sheet metal. Also fine for soldering and brazing. Fully guaranteed. Approved by Automotive Test Laboratories. Easily portable on casters.

WORKS FROM 110-V SOCKET. Simply plug into 110-Volt or 220-Volt light socket—costs only few pennies an hour to use. Has complete heat controls. Anyone can use easily. Full instructions included. **AMAZING DETAILS FREE!** Write today for sensational facts about Aladdin Arc Welder for $39.25 including De Luxe Accessories.

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COMMONWEALTH MFG. CORP., Dept. U-52
4208 Davis Lane Cincinnati, Ohio

"Ifs" Of The Titanic Tragedy

[*Continued from page* 120]

decks and strange passageways from the lifeboats, waited like frightened, dumb cattle. Many of these helpless people died as nobly in their bewilderment and fear as the gentlemen of the first class, calmly chatting and smoking.

In the boats, Gracie said, "Our hopes were buoyed with the information imparted through the ship's officers that there had been an exchange of wireless messages with passing ships; one of which was certainly coming to our rescue."

At 2:35 a. m., Captain Rostron, surrounded by his officers, all peering into the darkness ahead, keen to avoid a fate similar to that of the *Titanic*, saw a green light. She was still afloat! An hour later they were almost up to the position but the light was low in the water; it was only a boat burning the White Star Line's green night flare. The reflected gleam of a star revealed an iceberg dead ahead. It was a close call; Rostron had to alter course quickly several times to dodge bergs and growlers.

The *Carpathia* stopped at 4 a. m. Ten minutes later they took aboard the first load of survivors, 25 from a boat which could have held 50. The officer in charge was escorted to the bridge where he confirmed Rostron's fear—the *Titanic* had gone down! They were an hour and a half too late!

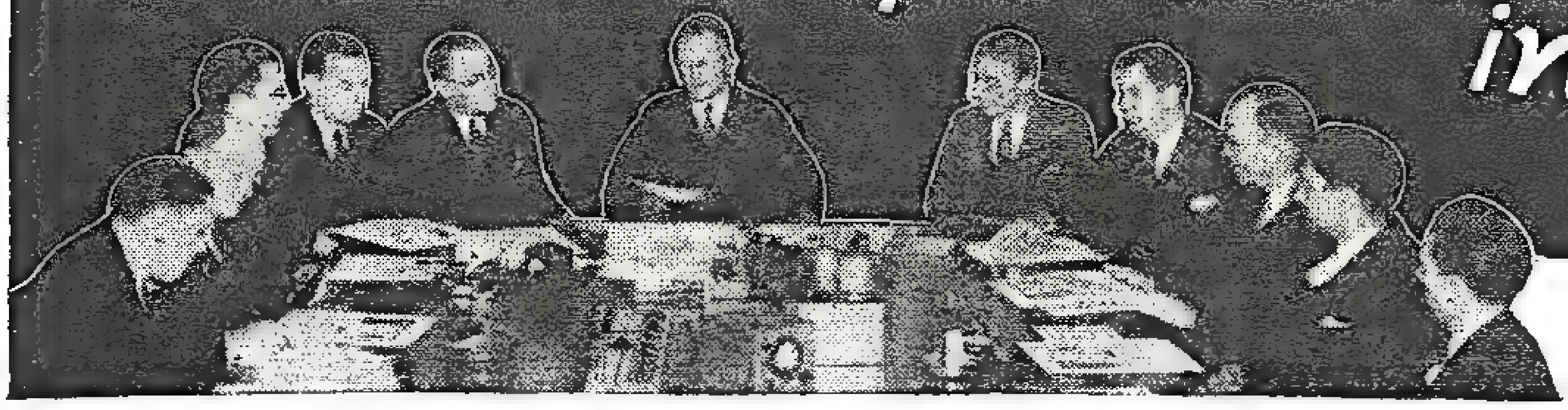
Daylight paled the east at 4:30 o'clock and facilitated the recovery of other boats. Rostron sent an officer aloft to count the icebergs. They were surrounded by bergs and masses of field ice as far as the eye could see. They continued picking up boats. A bright morning sun gilded and tinted the bergs; the sea smiled pleasantly. It seemed impossible that 1,500 human beings had died in this quiet place only a few hours before.

The survivors came aboard quietly with no hysteria and with very little excitement until the last boat was picked up at 7:30 a. m. A careful count revealed 712 rescued. Only then did the awful realization sweep through the crowd of survivors that there were no more, and that there was little or no hope for the hundreds of missing husbands, wives, children, and kin, or for the gallant crew. Of a score of honeymoon couples only widows and one bridegroom survived. Two infants survived a father whose name they could not even lisp. He had handed them into a boat and stepped back with the men. The irony of "women and children first" stood tragically revealed in the person of an elderly German immigrant woman. She had lost her two sons, all she had in the world. One of them had carried their money in a money-belt as they were bound for America to begin life anew.

We must now set down, in more detail, the story of the "ship-that-might-have-saved-all," the SS *Californian*. Here is a story stranger than fiction and almost past belief. Captain Lord, after his ship had been stopped by ice, asked Evans, his

[*Continued on page* 135]

Train at Home...Under Factory Engineers for GOOD PAY Spare-Time and Full-Time Jobs in RADIO



APPOINTED BY RADIO MANUFACTURERS TO SUPERVISE R-T-I TRAINING

This is the R-T-I Advisory Board—Engineers and Executives of large Radio firms—appointed by these firms to supervise and direct R-T-I Training. Put your future in their hands. 50 great radio manufacturers now endorse this Training.

RAY D. SMITH, President R-T-I, who has directed training of 100,000 men. Read what a few students say.

"Made my first spare time money after finishing four lessons. Over $500 spare time money in 10 months. R-T-I is O. K."
Delmer Grote, Route 5, Greenville, Ohio

* * *

"I made $14.25 in first 11 days of my training following your instructions."
C. E. Head, 431 Third St., Alexandria, La.

* * *

"Before finishing my training I was made Manager of a Department Store's radio section."
Howard N. Lentz, 123 W. Alexander St., Buchanan, Mich.

* * *

"My job paid me $18 a week before taking your training. Shortly after starting was averaging $60 a week. Have made as high as $250 in single week."
Wm. T. Ridd, 3452 Evelyn St., Verdun, P. Q., Canada.

Trained Men Needed in All Branches

If you're dissatisfied with small pay—lay-offs and an uncertain future—here's an opportunity that's too good to miss. At the cost of only the time it takes you to mail the coupon, you can get my big FREE book, "RADIO'S FUTURE AND YOUR OPPORTUNITY." This book tells how you can **learn at home under the supervision of factory engineers, to make more money** almost at once in Radio—whether you want to make Radio your life's work, or use it to pick up an extra $5 to $20 a week in your spare time.

More Opportunities Than Ever Before

Radio is still forging ahead. **1936 beats all other years.** Over 6 million new sets sold. Over 30 million dollars paid for service alone this year. Where only a few hundred men were employed a short time ago, thousands are employed today. And where a hundred jobs paid up to $75 a week—there are thousands of such jobs today—many paying even more. And new jobs are being created all the time—**full time jobs and spare time jobs.** Get my book and see how easy it is to learn at home for this good-pay work.

"Shop Training" for the Home

R-T-I Training is different than any training you ever heard about. It comes to you right from the heart of the Radio Industry—right out of the factories where Radio sets and other vacuum-tube devices are made. It was planned and prepared and is supervised by big radio engineers IN these factories—by men appointed for the purpose. This means that trained the R-T-I way, you'll be trained as the Radio Industry wants you trained—just as the Radio Industry, itself, would train you if it was doing the job.

Television, Photo Electric Cells, Public Address Systems Included

Radio Service work is only the starting point in R-T-I Training. From there it will take you through the whole field of Radio and Electronics. You will learn about every new development, including Television so you'll be ready when Television breaks. You'll also learn the big money subjects such as Aviation and Auto Radio; Public Address Systems; how to handle Photo Cells; Sound Picture Recording, Etc.

4 Working Outfits Furnished

Start almost at once doing part time radio work. I furnish 4 outfits of apparatus that you build into test equipment with which you can do actual jobs and earn extra money. My Training pays its own way and you get your money back if not satisfied.

Age or Lack of Experience No Handicap

You don't have to be a high school graduate, nor even have finished the grades. My Training is so simple, easy, and practical, that the average man, regardless of age, education, or previous experience can master it. It offers the chance you have wanted to get out of a small-pay, no-future job, into good pay work with a future, in Radio and all its branches.

Get My Free Book

INVESTIGATE! Learn why R-T-I Training is different. Find out why R-T-I Trained men get "Quick Results" and "Big Results." Send for your copy of "Radio's Future and Your Opportunity" today. It tells you about Radio's amazing opportunities. It describes my approved training. It tells what R. T. I. students are doing and making. It gives the names of my Advisory Board and 50 endorsing manufacturers. It's FREE. Clip, sign and mail coupon RIGHT NOW!

RAY D. SMITH, President

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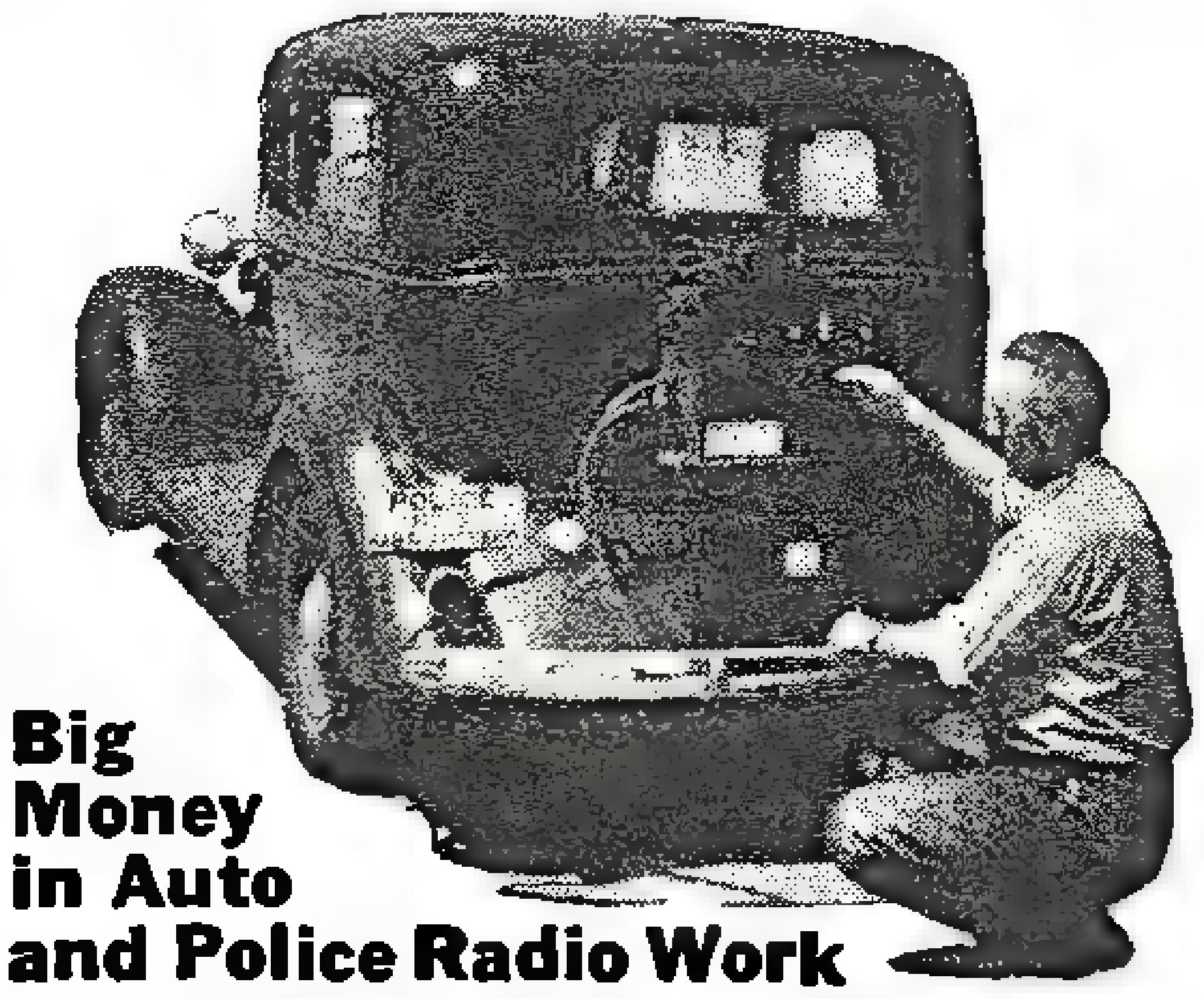
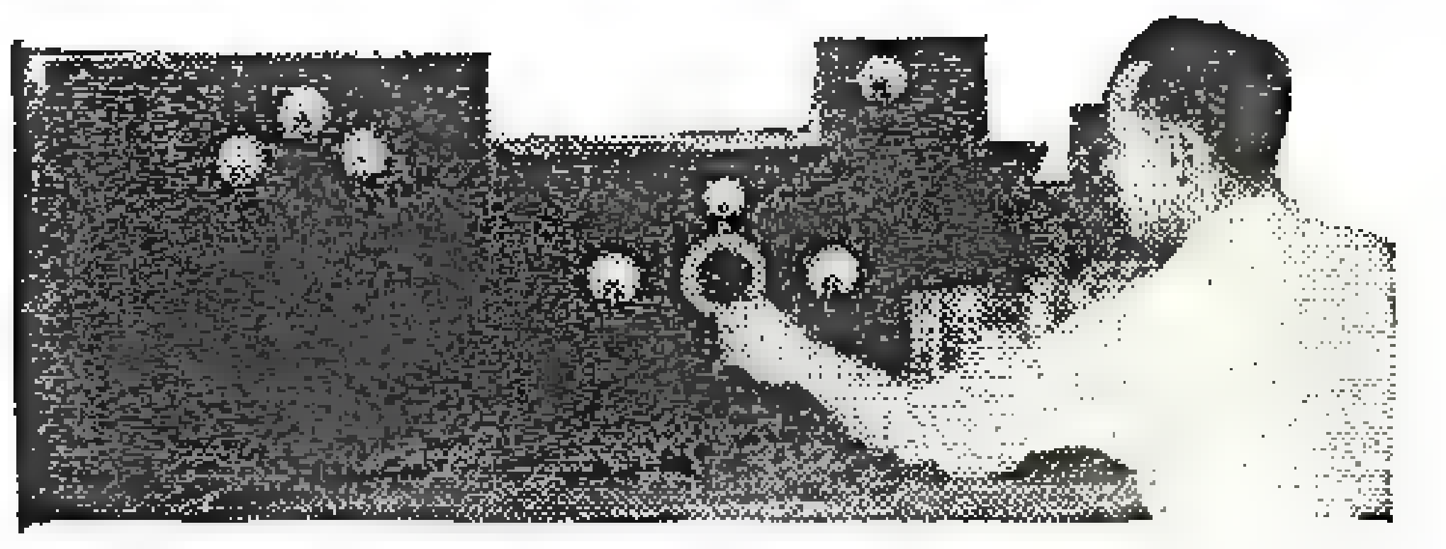


Big Money in Auto and Police Radio Work

W. H. Carr, 402 N. 16th St., Kansas City, Kansas, an R. T. I. student, has charge of 35 radio equipped cars for the Kansas City Police and Fire Departments. His salary is $230.00 a month and he is furnished with an automobile, gas, oil, etc. He says, "If I had not taken your course I would not be able to hold this job."



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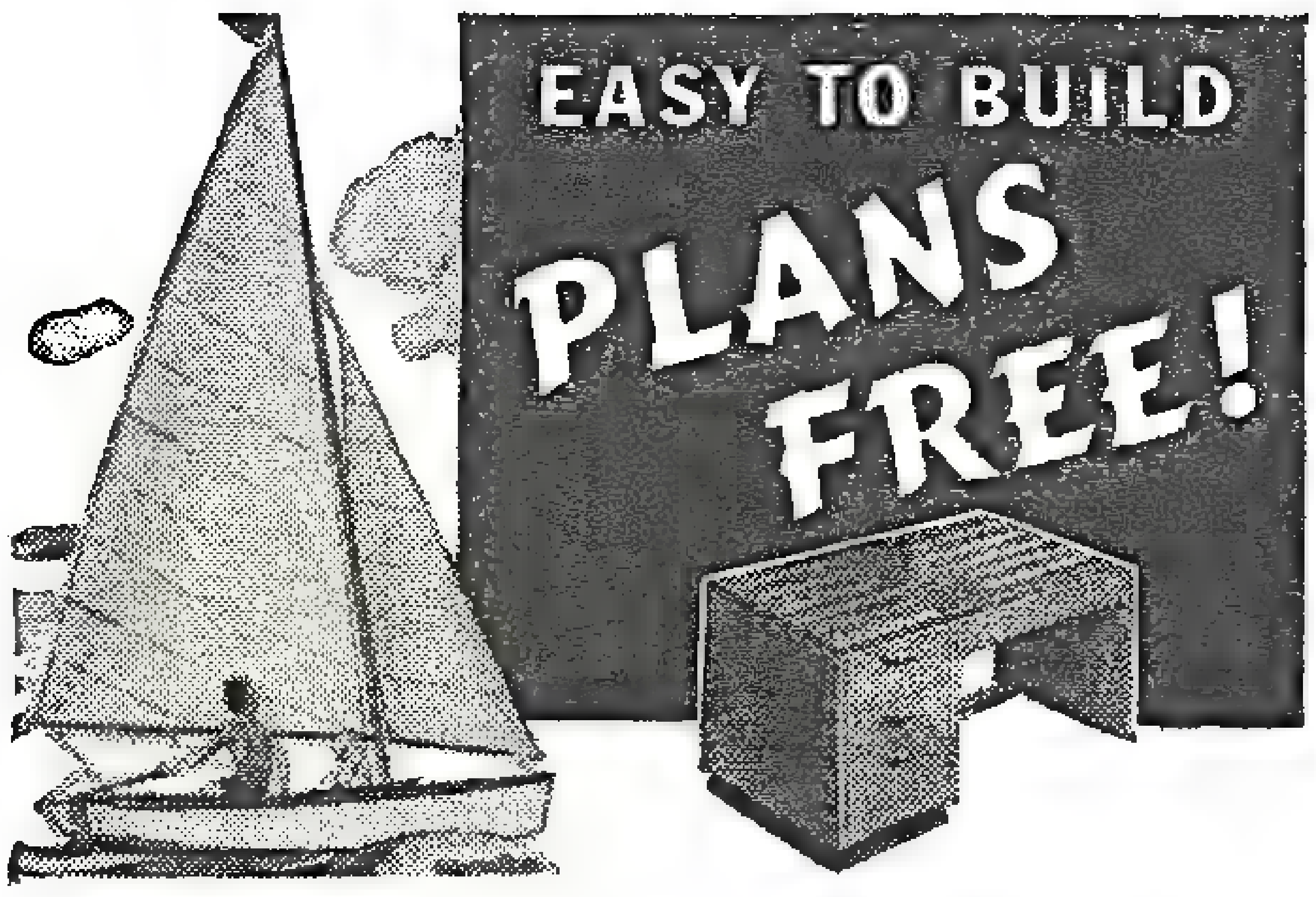

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Build This Automatic Washer

[*Continued from page* 114]

is filled with sand and a small wood plug is tapped into each end. Now bend the ends sharply at a right angle and in parallel planes. Just inside of these bends and at right angles to them bend the tubing. Follow this same procedure with a piece of ⅛" copper tubing. A glance at the illustrations will make this explanation clear. The plugs are removed and the sand tapped out. The sand is to prevent the tubing from "kinking" at the bends. About 5" from the top and at one end punch two holes to receive the bent ends of the ¼" tubing. Punch two holes in the bottom to receive the ⅛" tubing and solder these in place inside and out.

A piece of ⅜" copper tubing about 20" long is now bent to the shape of the tank. Place a female fitting on the end and flange the end of the pipe if it is not already flanged. Flatten the other end and solder. Using a round or rat-tail file, file the center of the tubes soldered to the tank, half way through and file the ⅜" piece to correspond to these holes as defined in the perspective diagram.

Next carefully solder these joints, using plenty of solder but taking care not to fill the tubing. Punch a hole in the bottom of the tank and solder a small drain cock in place. Cut a 1" hole in the center of the tank in the opposite end from the tubing and insert a ¾" pipe nipple, using two pipe nuts and rubber gaskets to secure a water-tight fit.

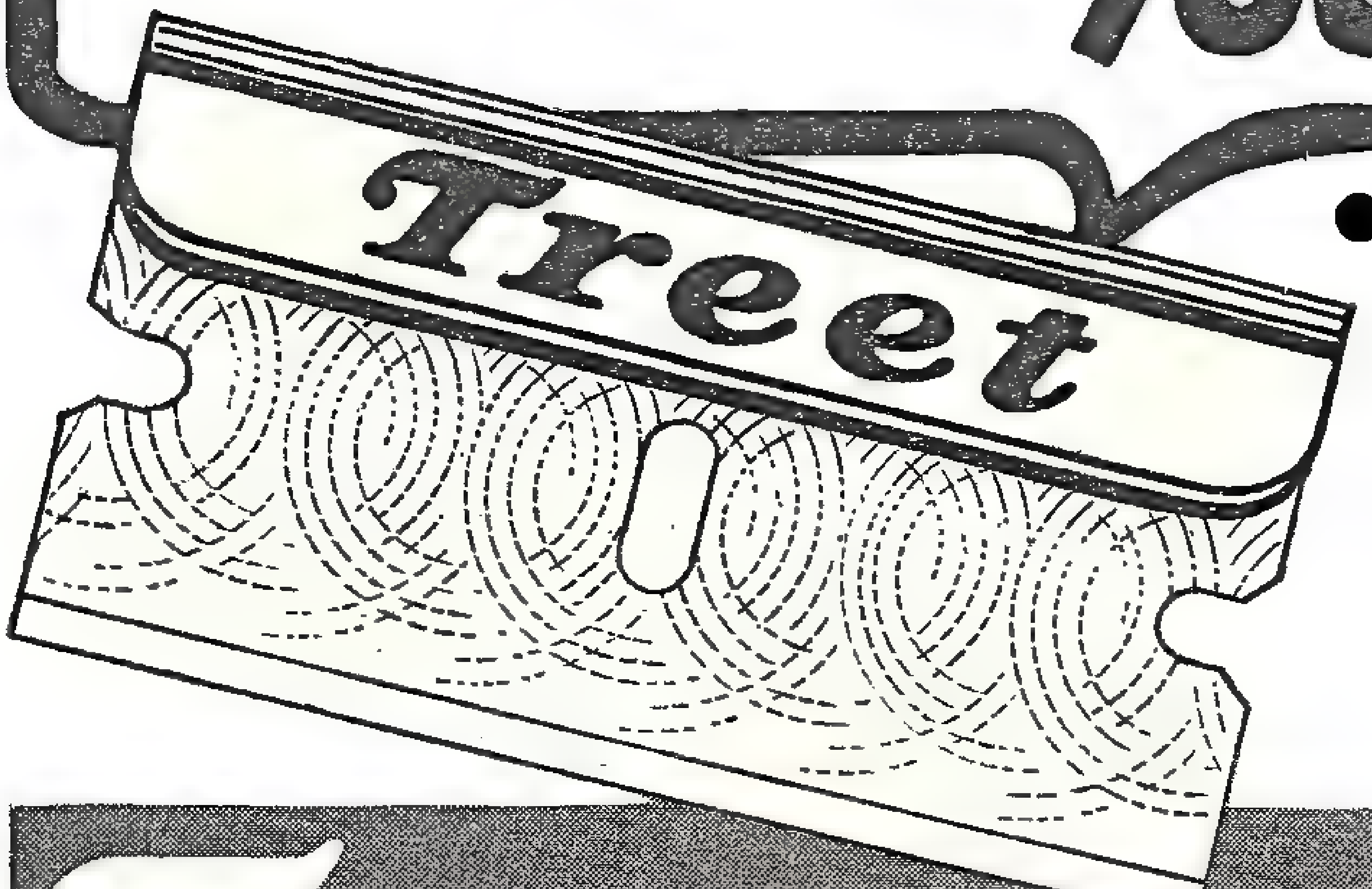
Cut three galvanized strips, 8" wide, to form the shields or deflectors which are mounted over the inlet and outlet tubes. The shield in front of the outlet opening is drilled with several ½" holes. The other two shields are smaller and are soldered inside the tank just over the tubes. These shields prevent the prints from catching on the tubes as they rotate in the tank.

Connect the water supply to the tank with ½" pipe and near the tank place a needle valve in the line to control the flow. The outlet is piped to a drain or nearby sink. The tank is best mounted by fastening to the wall with three lag screws inserted close to the top *above* the overflow pipe.

Prints up to 8" x 10" may be washed in the tank by merely placing them in the water and adjusting the flow to permit a slow rotation of the prints. Cut films may be suspended from the top with a rod and allowing the water to flow slowly. Films should not be allowed to rotate in the tank.

Before enameling the tank with an acid resisting enamel, wash with vinegar or dilute acetic acid or the enamel will not adhere well to the galvanized iron.

Colonial houses were not ordinarily painted white in real Colonial days; mostly they went unpainted.



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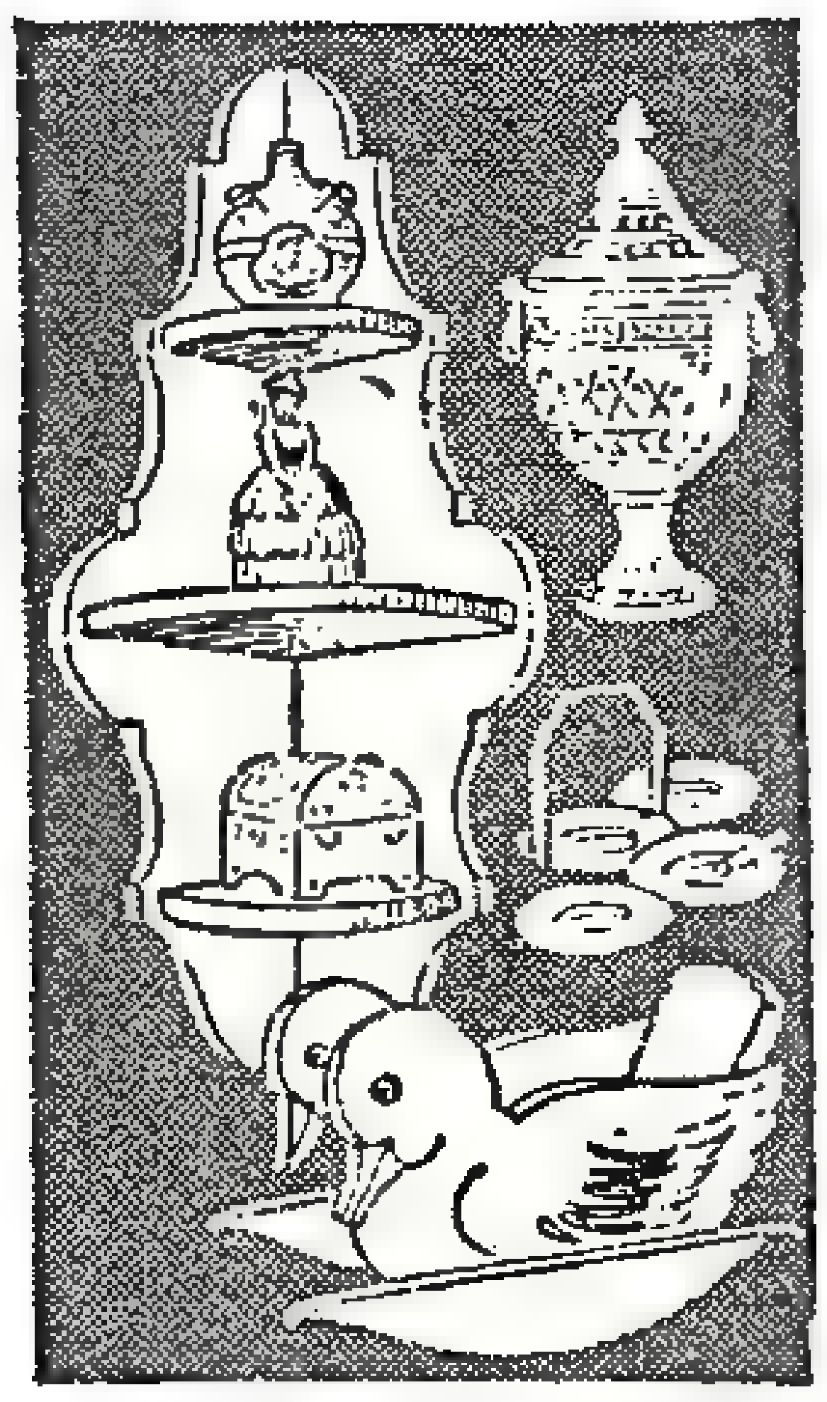

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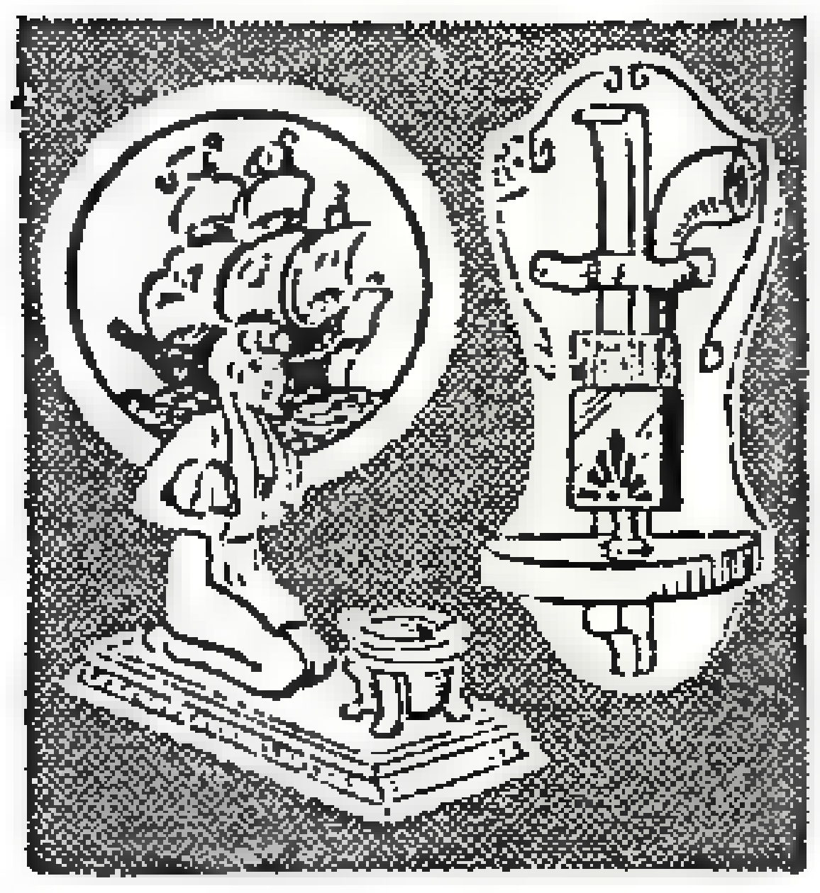

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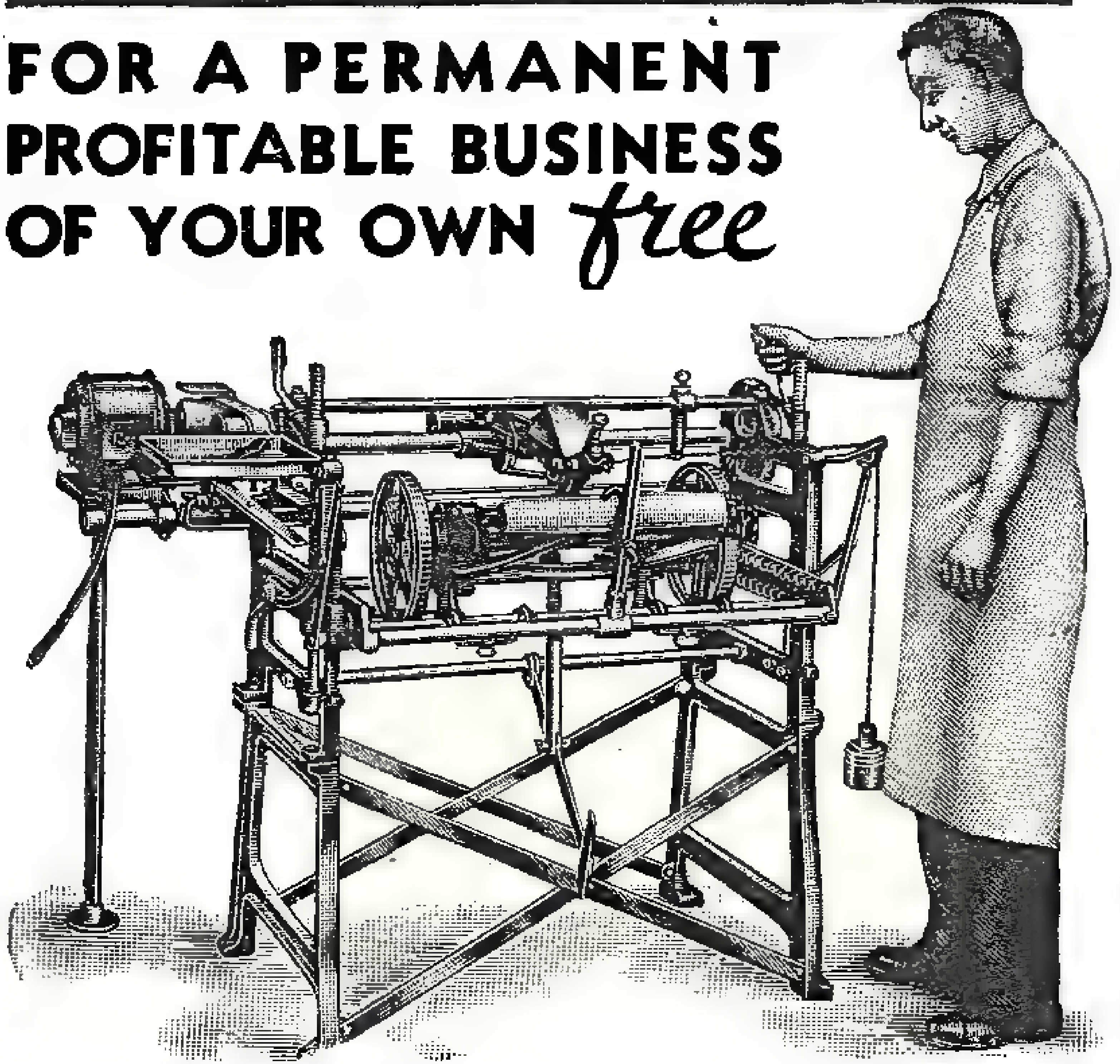

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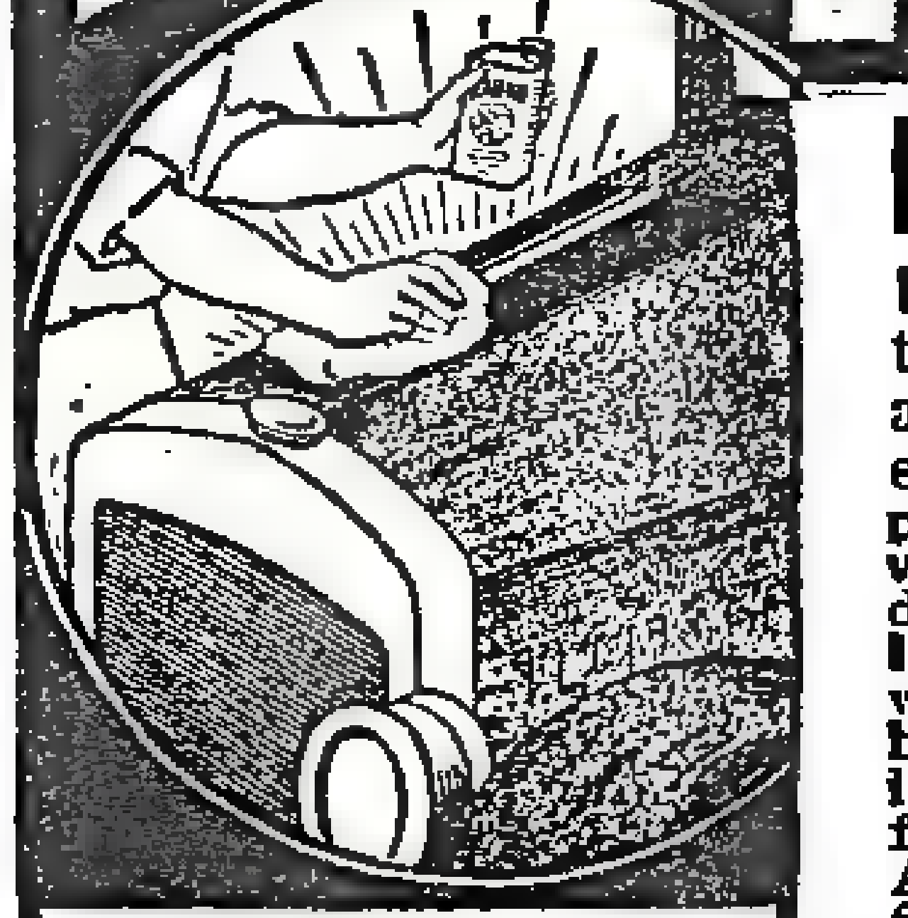

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Rope Stunts For The Amateur

[*Continued from page* 95]

apparently pull it completely through his neck. The illustrations on page 94 show how this illusion is performed. Two ropes of equal length are folded in the center and the loops interlocked by applying pressure with the thumb. The performer walks forward with the ropes, concealing the loops in the palm of his hand, and allows the spectators to securely tie the ropes around his neck. The looped portion should be placed at the back of the neck and held in place with the thumb and forefinger. The audience will not be suspicious of this if you mention that you are protecting your neck from possible friction burns from the rope.

At a given signal have the spectators pull the rope and at the same time release the pressure on the loop, hooking your finger on one of the ropes so that you can quickly gather both loops and hold them up to your audience. Performed in the proper manner the rope actually appears to pass through your neck.

The "Ghost Release" is another simple but very effective stunt in which the performer permits himself to be securely tied to a chair with double ropes passing around his wrists, ankles and waist and after allowing spectators to inspect his bonds frees himself in a split second. In this stunt the ropes are prepared in much the same manner as the rope used in the "Strangled Rope Escape" except that the loops are tied together with cotton thread having the same color as the sash cord. The ropes, after being tied in the middle with thread, are carried out on the platform by the performer, who conceals the joints in his closed hand so that they appear to be just two ordinary lengths of rope. Tie the first knot yourself so that the joints are not visible, then allow the remaining knots to be made by members of the audience. To make your escape simply give the ropes a sharp tug to break the threads and pick up the pieces of rope, brushing off the strands of thread. Spread each loop so that the impression of the thread does not reveal the secret and pass the sash cord around in the audience. Since each of the jointed sections forms a perfect loop, detection is impossible.

For the concluding stunt the magician depends entirely upon human nature and not on trick knots or splices as in the previous escapes. In the "Shackle Wrist Slip" the performer comes forward with a one hundred foot coil of rope and allows half a dozen people to assist in tying him up in any manner they care to choose.

Have the spectators start by tying your wrists with one end of the rope and then proceed by tying you around your arms and waist so that the rope winds in a rather wide "X" formation. When spectators are winding the rope around your body and tying you up securely insist that they work fast. Be sure that one person doesn't do all the work. The more people involved, the better and quicker are your chances for escape. By remaining moderately rigid during the tying-up operation, you will be able to free yourself in a few minutes simply by wriggling out of the rope wound about your waist and untying the knots in the remaining rope. One person may be able to tie you up securely, but never a group of people as you will discover when you try this clever stunt.

All of the escapes described here can be mastered without difficulty and will provide plenty of live entertainment for a party or social gathering. Mastering the various types of knots such as described in Scout Handbooks will prove valuable if you intend to devise similar stunts of your own.

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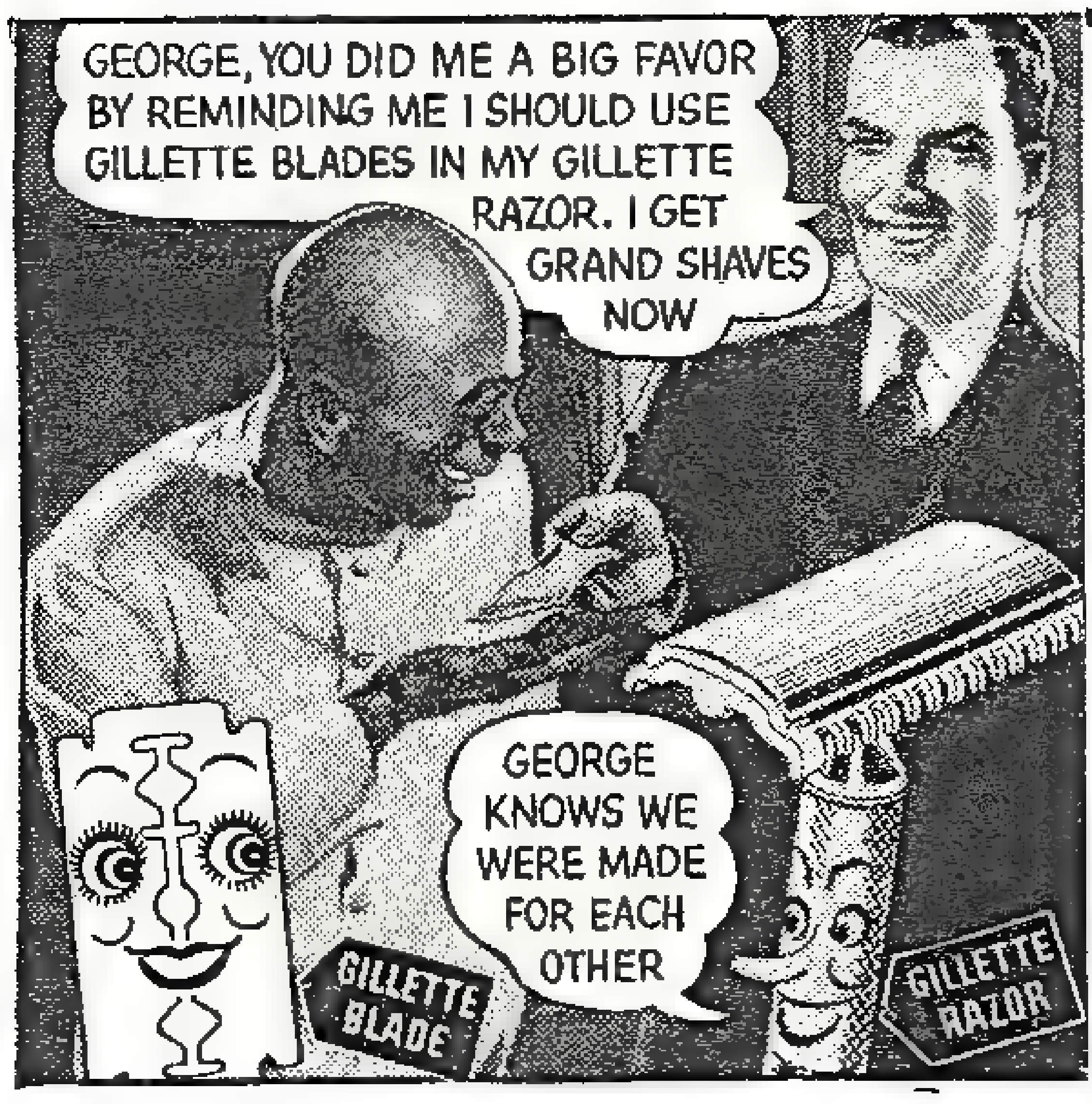
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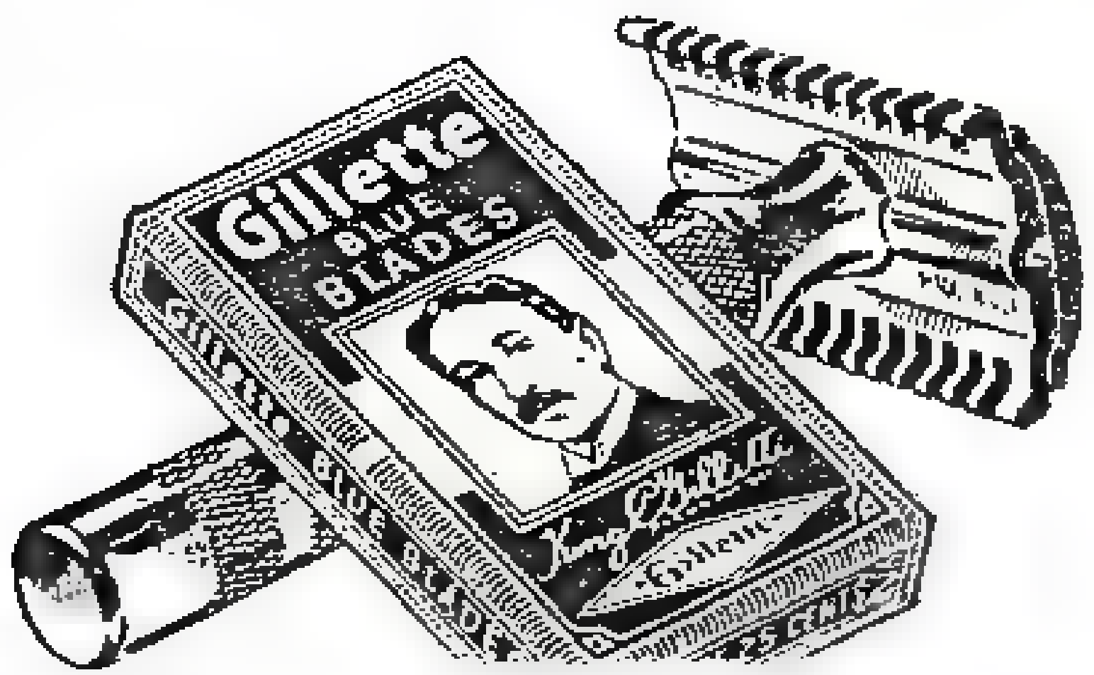

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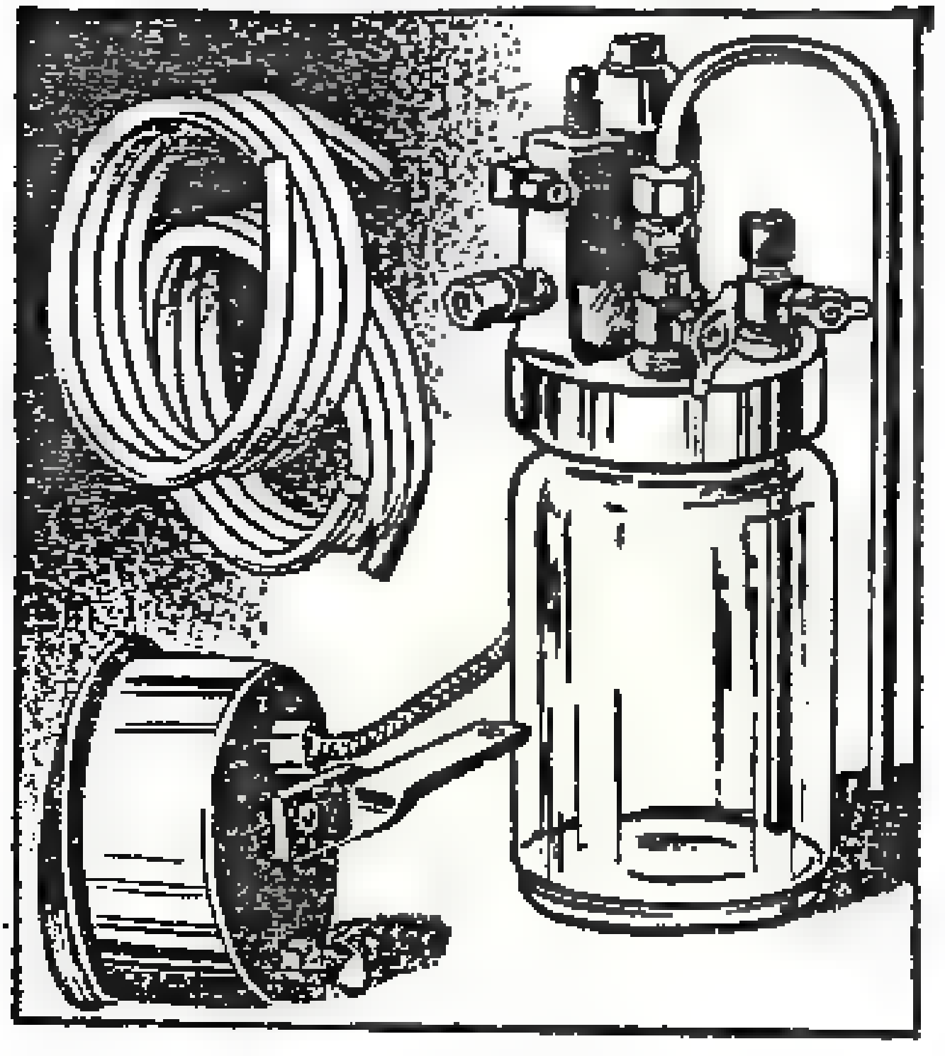

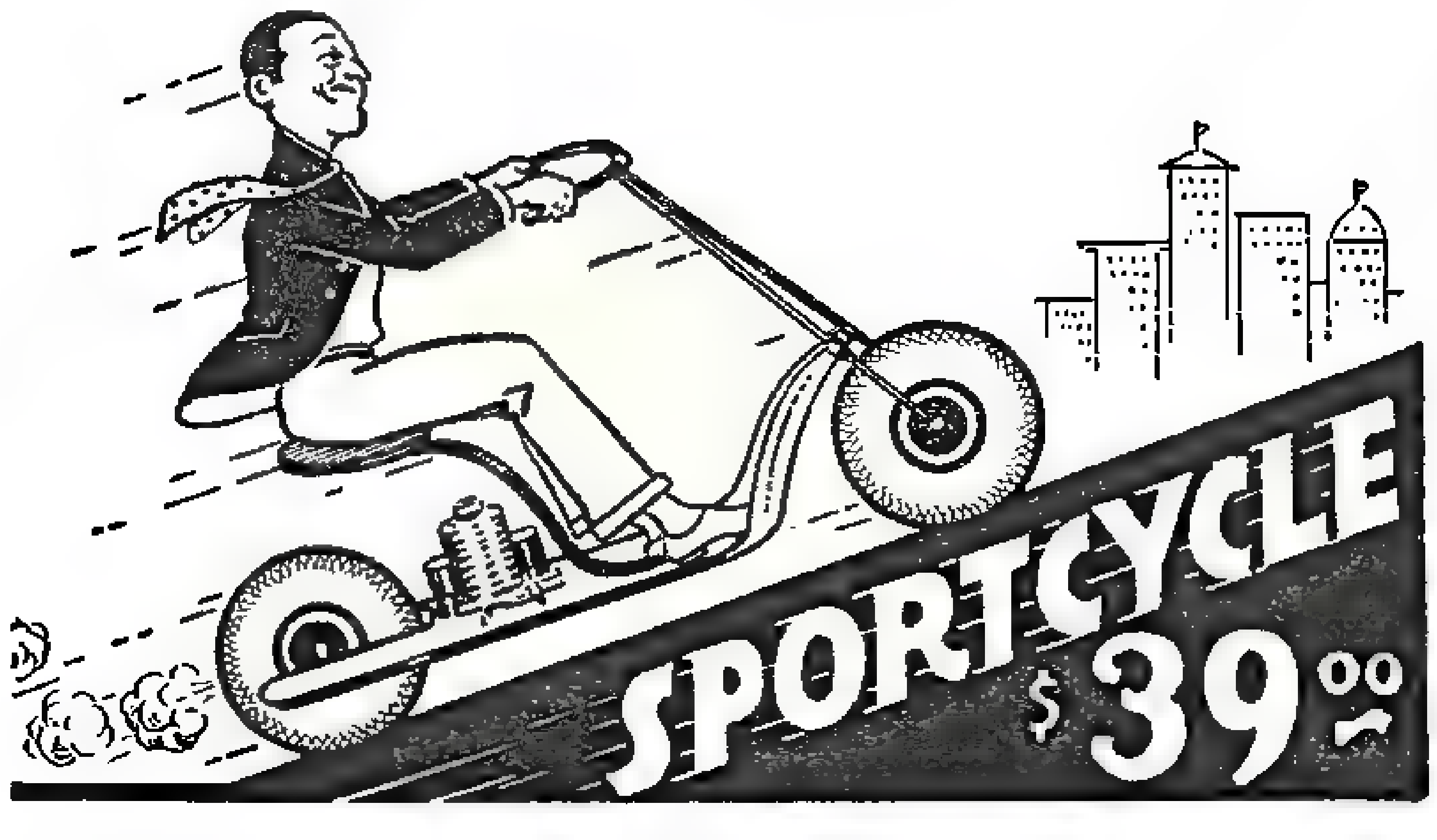

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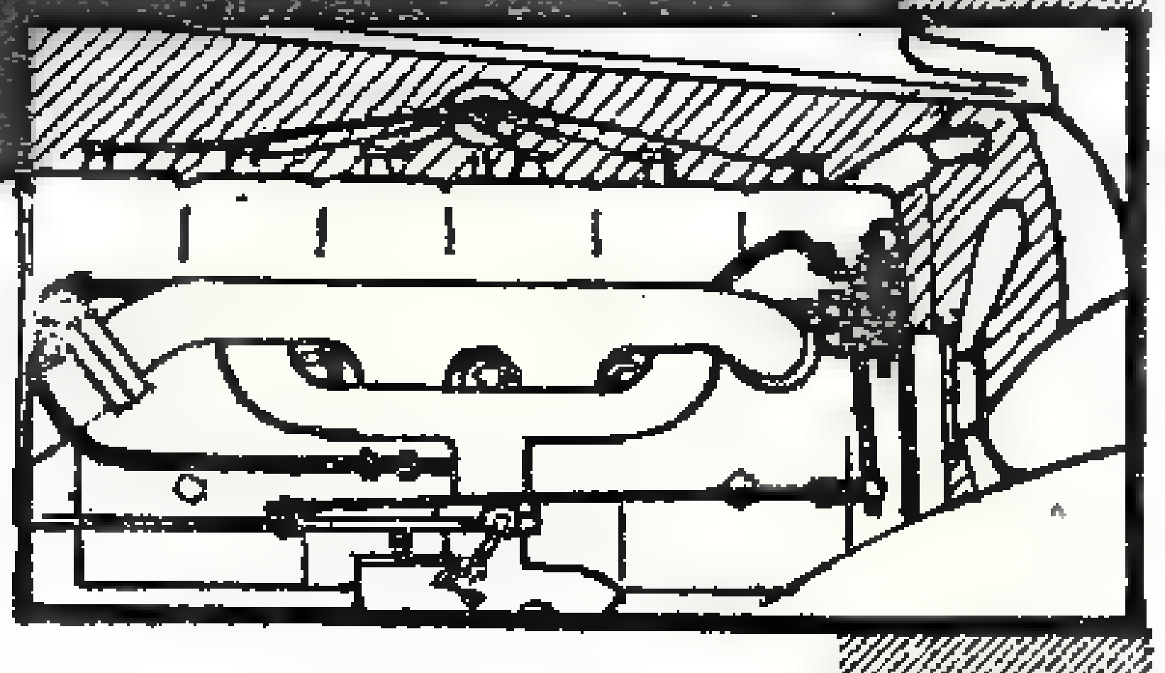

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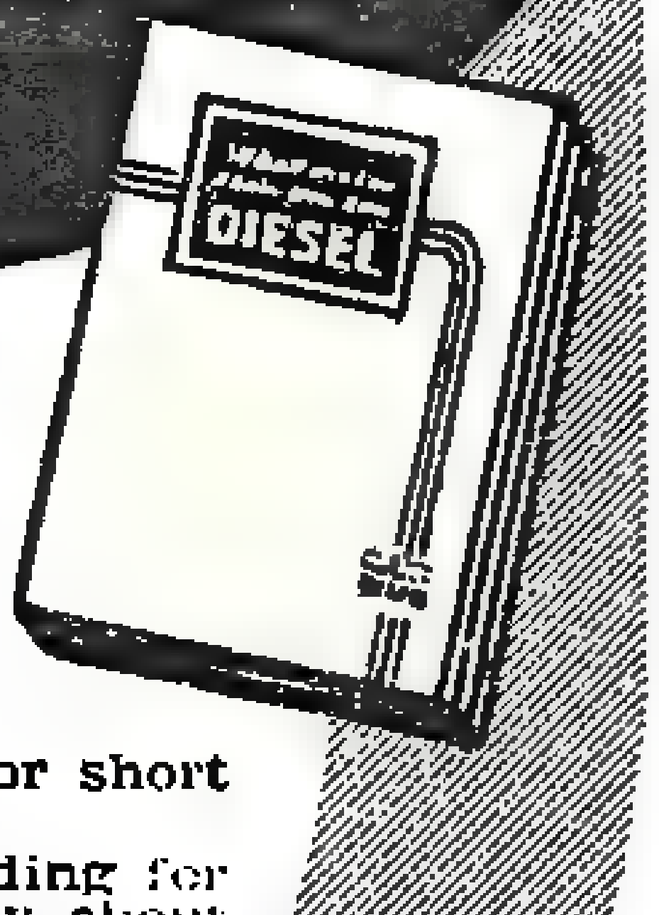

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Accessories For Trout Fishing

[*Continued from page* 117]

affords a better reach. For large trout select a net with a generous width of frame for reasons that should be obvious. To land a large trout in a small net is little short of nerve-racking.

While fishermen have been known to get along without fly books in which to store their flies, the fact remains that they are very nearly an absolute necessity. Fly books come in all manner of sizes and material, good, bad and indifferent. A large fly book will carry from ten to twelve dozen flies or more. The usual procedure is to carry your supply of flies in a large fly book, leaving it at your stopping place, then carry a smaller fly book in which the few flies to be used for the day will be enclosed. A large fly book is often very difficult to handle when standing in mid-stream. Cheap, imitation leather fly books should not be used. They soon become ragged and useless.

Metal leader boxes with felt pads are used a great deal and are very handy. There are simple leather pouches that also serve the purpose. A rubber snuff pouch of the flat, compressed sort is an unusually handy article in which to carry leaders, keeping them moist and flexible. Glycerine applied to the leader pads aid in keeping the leaders soft.

For the upright-winged dry flies and like lures there are fly boxes two inches deep, with various compartments with transparent lids. There are some unusually excellent ones on the market. They are made to fit in certain pockets for the purpose in fishing jackets. A very good idea is to attach a cord to your fly book, fly box, etc., the same likewise attached to the coat so that you will always have them in check if you should take a spill or they should fall out. Some have their tobacco pouches and pipe in check with chains or cords in the same way. It is not a bad idea.

Novelties From Walnut Shells

[*Continued from page* 108]

With all the nuts in place, re-mount on the lathe and turn under high speed and cut with sharp tools. Sharp tools and high speed are necessary to prevent the lacy structure of the nut from chipping out. Turn out plate front to the desired shape, and then turn the back by the conventional chuck method. When completed the nuts extend through the plate with the design showing on either side. Finish on the lathe with a "French polish," which is a mixture of two parts shellac and one part boiled linseed oil, applied with a rag under high speed. Or, if desired, finish with a coat of shellac followed with two coats of rubbed varnish.

Novel and attractive jewelry can also be made of the nut designs, as shown in the illustrations. A variety of patterns can be obtained by cutting the nuts at various angles.

Mechanizing The Mounties

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[*Continued from page* 45]

to explain that the police uniform forage cap, a "pillbox" cocked over the right ear by its chin-strap, was "no use at all on the prairies." Superintendent Jarvis boldly offered his idea of a useful hat for policing the plain, "a broad-brimmed hat of soft felt." But the superintendent was ten years too modern for Ottawa. It was not until late in the nineties that the broad-brimmed felt "stetson" recognized from Hollywood to Moscow as the trademark of the Mounties was approved and issued.

Requests for mechanical aids to prairie police work met somewhat swifter response from the Canadian Government of fifty years ago. But not too swift. In the year '85, Superintendent Jarvis—he of the hats—was asking for two telephones, price fifty dollars, to connect the two main posts of his division, "so as to ensure attention for our somewhat urgent business" when the railway telegrapher was away drunk. Two years later he was still asking for the telephones and from further west the Lethbridge command was putting in its annual appeal for a telegraph line —"one to Milk River would save our horses' legs."

Persistent modernity was rewarded at last. In 1888, in all the posts, telephones went in, "greatly increasing our efficiency", Commissioner Herchmer reported, "and effecting an enormous saving in wear and tear on horses." In the same year the Mounties were further mechanized to the extent of one typewriter, the first in the force. It came west to Fort McLeod in answer to the commissioner's appeal for a "small printing press" which, he assured the Prime Minister of Canada, would "save an enormous amount of writing and free the constables for police duty." That first typewriter started something. In Regina barracks nowadays there are daily "typewriter parades" for recruits of the Royal Canadian Mounted Police.

Gasoline comes into the record twenty years after the typewriter, with the Peach murder case. Peach, owner of a lonely ranch forty or fifty miles south of Calgary, had disappeared. A Mounted Police patrol sent to investigate discovered his bullet-riddled body in a nearby river and telephoned Calgary for help in rounding up the suspected murderers before they skipped the country. Now forty or fifty miles cannot be ridden by any horsemen in less than a day and the call was urgent. So the officer commanding at Calgary went modern and hired an automobile for the journey. The journey was made and the murderers caught. They confessed their crime and were brought in to Calgary for trial. Then the innovator sat down to write his report.

Concerning the crime, capture and confessions it is a model of brevity, but when it comes to the usefulness of the hired automobile it might almost be called effusive for a Mounted Police document.

[*Continued on page* 131]

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Flying Cloud

[*Continued from page* 84]

where white paint will be used over it. The planking on the raised sheer is fitted similar to the side planking, and if a classy job is desired should be of mahogany and finished natural. The decking in the bow well will be easier to fit if the planking of the upper sheer is delayed until this job is finished.

Now is a good time to get in the motor beds and install the motor. The exhaust piping as well as all fuel and water lines will be a lot easier to fit at this time. With these in place the cockpit floor should be laid and canvassed. The steering gear installed and then the two ends of the cockpit built up of tongue and grooved staving with joints painted. The bridge deck is now laid and canvassed. The cockpit canvas turns up under the trim around the floor so that it can be easily renewed. The bridge deck canvas is turned down over the forward cockpit end and up under the cabin end bulkhead to make a weather-tight job. A generous application of gray Staytite cement will insure watertightness. The cabin end bulkhead is now completed and trimmed off flush with the top of the beam. Door posts are installed and the cabin top is ready to be laid. This is laid up using tongue and grooved material with a vee edge, or beaded edge as the builder desires. It will be found that the vee edge is much easier to paint. The planking of the raised sheer should be left an inch and a half high forward of the cabin and the cabin top material worked to a thin edge along the raised sheer at the bow to allow the cover board to finish out as a rail cap forward.

When the cabin top material is close enough to the companionway to support the beams, they are cut and the headers for the companion hatch fitted. The cabin top material is then continued across to the side of the boat. The top is covered with number ten canvas with the material laid up with either a seam down the center, or across the hull if narrower material is used. In event that the material is laid across the boat all seams should lap aft. All of the canvas throughout the boat is either laid in marine glue or white lead thinned with varnish. Seams and edges of the canvas are secured with ½" copper or galvanized tacks spaced on no more than three-quarter inch centers. The canvas should be wet down immediately after laying and painted with a priming coat when partially dry. The forward and aft decks are laid up in narrow strips of edge grain material and the seams caulked. They can either be finished natural or painted as the builder desires. The seams of these decks are filled with deck seam composition or gray Staytite. Sufficient material should be allowed around all deck openings when the canvas is laid to turn up inside the framing of these openings to keep the water out. After the canvas is primed the cover boards may be laid in thin white lead.

[*Continued in June Modern Mechanix*]

Mechanizing The Mounties

[*Continued from page* 129]

Its writer seems to have had an uneasy feeling that the automobile would take a lot of justifying.

The same uneasy feeling may be traced in the chief commissioner's report for 1919-'20, the year motor cars were first listed among Mounted Police transport. "Owing," it runs apologetically, "to the general use of motor-cars, it has been found necessary to supply mechanical transport, to a considerable extent replacing the old horse transport . . ."

In the light of events, the apology for a few automobiles reads oddly. Within a few years the Mounties had taken to wings and water.

It is just fifteen years since the old Royal Northwest Mounted became the Royal Canadian Mounted Police, and only four years since it took over the preventive service on the eastern and western coasts, made the first aerial patrol of the Arctic and shocked their most faithful admirers by putting to sea in pursuit of rum-runners. At the time there were the inevitable witticisms about the Horse Marines and the value of spurs in a nor'easter. But they are all forgotten. A Canadian no longer grins when he reads in his daily paper of a cargo of smuggled rum captured by Patrol Boat 000 commanded by "Chief Skipper Smith of the Mounted Police." He sees nothing queer in the fact that there are more Leading Stokers, Able Seamen and First Class Engineroom Artificers in the ranks of the riders of the plains today than there were mounted constables in 1873.

Horse Marines and the rest of the timeworn jests notwithstanding, the Mounties do not go to sea in spurs. They wear the blue serge jumper and bell-bottomed "slops" drill collar and flat-topped cap of the British navy. Only on their cap ribbons are the initials R. C. M. P. and their arm badges bear the famous buffalo head crest with its motto: *Maintiens le Droit* (Maintain the Right).

The sea-going Mounties have had a tough time doing it. They are the men who run against mechanized lawlessness in its most efficient form. High-powered motor ships at sea, highpowered cars on land, highpowered speedboats operating between ship and shore and shortwave radio connecting all three make a rum smuggling combination hard to beat. Sir James McBrien, head of the Mounted Police, frankly admits that they haven't beaten it yet. But growing lists of seizures and convictions attest that since the Mounties took to sea the trade of salt water liquor smuggling has been neither as safe nor as profitable as it used to be. The same lists show that Mounties in the air have added nothing to the joy of the rum-runner's life.

Air patrols, made in the seaplanes of the Royal Canadian Air Force, are today ordinary Mounted Police duty on both coasts. The aircraft, radio equipped, patrol hundreds of miles of coast and

[*Continued on page* 132]

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Mechanizing The Mounties

[*Continued from page* 131]

coastal waters, spotting suspicious looking vessels, signaling their position, and "standing by" above until the nearest powerboat patrol turns up to inquire into the stranger's business. The flying Mounties are playing an increasingly useful part in the international working agreement established between Mounted Police coast patrols and the United States Border Patrol.

Tomorrow will be the day of the air smuggler. Already his advance guard has entered Mountie territory but so far it hasn't been happy there. The 1935 Mounted Police records show two cases of airplane smuggling. In the first, the load of smuggled liquor was seized but the plane got away. The second involved contraband cigarettes, transferred from aircraft to motorcar in a farm field. It turned out even more unluckily from a smuggler's point of view, for the Mounties arrived on the job at seventy miles an hour and the adventure in aerial tobacco importing ended in jail for the adventurers and the seizure of airplane, motorcar, and cargo. As R. C. M. P. headquarters see it, air smuggling is sure to come, though it's still a little too costly to be popular with the run of "free traders." When it comes, the Mounties intend to be ready for it. In the meantime there are the jobs on hand.

One job has always been on hand for the Mounted Police—hunting down contraband liquor. In the eighties it came into the Northwest in everything from imitation eggshells to barrels of coal oil. In the nineties it hit the trail of '98 just one jump behind the gold rush, but the Mounted Police were three-quarters of a jump ahead of it. Enterprising traders who came in from Skagway to do a little two-way smuggling in whiskey and gold dust found the Mounties waiting in the Pass. They found, too, established at the boundary and in good working order, the international working agreement already mentioned, product of the sound understanding with their opposite numbers in Uncle Sam's service that has been from the beginning the Mounties' particular pride.

From the Klondike to the coast of Nova Scotia, from '98 to '37, from dog sleds to 160 h. p., radio-equipped motorboats, is a good way, but in pursuit of their old quarry, the liquor-smuggler, the Mounties have taken it in their stride. The international working agreement that actually works has come along with them. At the moment, with the help of such modern improvements as wings, sea-legs and wireless, it is working well. Except in fog, gale, or the dark of the moon, a rum-runner can hardly spit over the twelve mile limit anywhere between latitudes forty and fifty north, without every Mounted Police and Preventive Officer from Halifax to Boston knowing it.

There is another chapter in the story of the modernization of the Mounties, and with it, too, there is an international working agreement. It is the record of radio and the last frontier; the tale of the men, the dogs and the machines that have carried law to the Arctic barrens and bestowed the mixed benefits of jazz and justice upon the simple Eskimo.

Its beginning was in 1921. In that year wireless receiving sets were installed in all the Arctic outposts of the Royal Canadian Mounted Police. With the sets went instructions to chart reception and note the stations most consistently received. Next year, headquarters in Ottawa, guided by the information gathered, arranged with American commercial stations from Boston to California the first R. C. M. P. broadcasts to the Arctic.

Tales of the coming of those first messages read like the unlikeliest fiction. As good as any is the one of "Inspector Blank" stationed at Herschel Island in the Western Arctic. Inspector Blank came in from a three weeks' patrol among the ice floes, turned on his radio, sat down, and started to take off his fur boots. Before the second boot was off he heard, from Station K. O. M. O., California, the announcer's voice: "I have a personal message here for Inspector Blank of the Royal Canadian Mounted Police stationed at Herschel Island, Western Arctic . . ."

Inspector Blank mushed a hundred and fifty miles out to Aklavik to send a wireless to Station K. O. M. O. with thanks for that message.

That was the beginning of radio in the North. Today, messages from R. C. M. P. headquarters go on the air at fixed times to the Canadian Government station at Aklavik, are rebroadcast, picked up by the wireless of the R. C. M. P. Arctic supply ship, *St. Roch,* and rebroadcast again to reach the farthest outposts of the Western Arctic. The Eastern Arctic posts cannot be reached that way. Only with one or two of the more powerful stations of Eastern Canada and the United States is their touch sure, so each summer the year's one supply ship carries in, by no means the least precious part of her cargo, the schedule of dates and hours of the coming year's Far North Broadcasts from stations W8XK and KDKA Westinghouse and the Canadian Radio Commission's stations. Each week, at the hours fixed, the messages go out from the broadcasting stations of great cities to be gathered from the Arctic night by the antennae of many Mounted Police post wireless receivers.

News for a fur-trapper of a son born in Montreal; birthday greetings to a Hudson Bay factor from his sister in Scotland; advice to an Ungava prospector that his mother-in-law is dead in Vancouver, all mixed with the routine notices and orders of the force. All the brave and pitiful drama of man's life is in those messages. Lonely men, they say, will travel two hundred miles by dog sled to be in the police shack at the hour when they come.

One last story, to prove that, though mounts and methods change with the times, the spirit of the Mounties is unchanging. It is told, always

[*Continued on page* 134]

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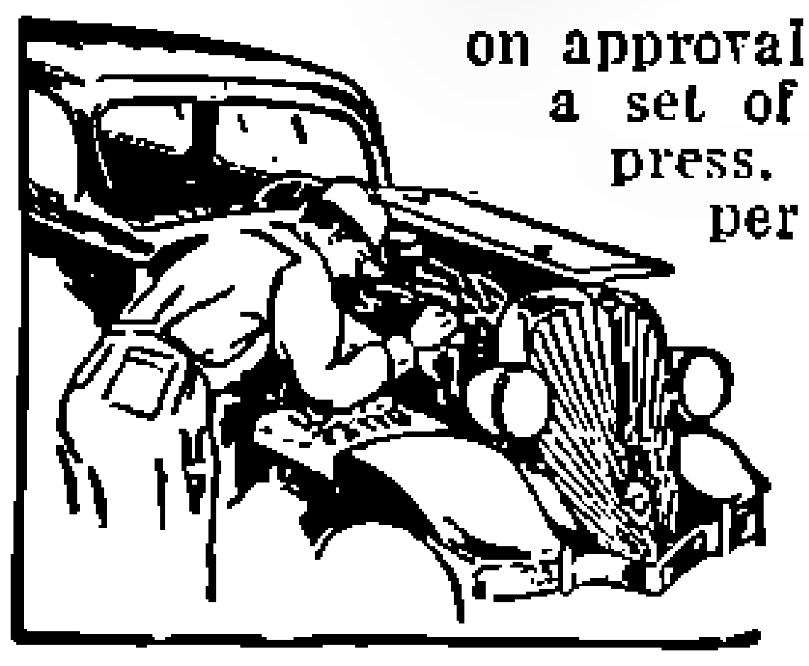

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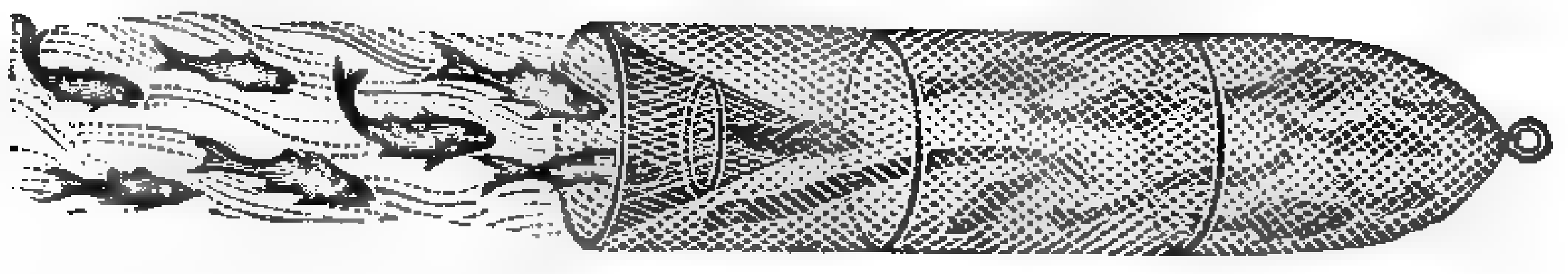

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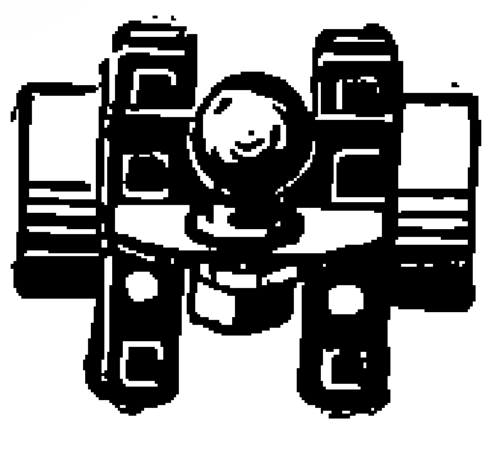

Mechanizing The Mounties

[*Continued from page* 133]

with deep feeling, by modernized Mounties—the story of the death of Rollo, the faithful flivver.

Its vintage is early 1920, a year when a watchful Dominion Treasury was still unconvinced that the Mounted Police needed all the motor equipment they wanted. In those days keen police officers used their own cars on duty and mileage was, occasionally, allowed. Rollo was such an officer's car, a T-model belonging to a sergeant of Mounties so junior that he still liked banana splits. The sergeant was stationed, with a constable still more junior, in a Western Ontario village not far from the Michigan border and Rollo was his pride.

On a warm summer afternoon Rollo's master sat in the village ice cream parlor eating a banana split. His constable sat with him. Rollo waited without. When the banana splits were no more than half eaten a large black car was seen to pass the window of the ice cream parlor. It was paying no heed to speed limits. The sergeant put down his spoon. After the big car came a little one, covered with dust and honking hard. His constable at his heel, the sergeant made for the door, for the driver of the second car was the chief constable of the next town.

Then began the ride that killed Rollo.

Five bounding miles out of town the faithful flivver overtook the second car of the two, pulled aside to let the red tunics pass. "Bank robbers!" its driver shouted. Rollo's owner did some fancy pedaling. Rollo shot ahead, caught the edge of the black car's whirling dust cloud and hung on. Forty-three, forty-four, forty-five—leaping from rut to rut, chugging hard on all four cylinders, rattling in every bolt, Rollo hung on to that dust cloud while his master ate dirt and played variations on the throttle.

Forty-nine, fifty, fifty-one—snub nose boring into the thick of the dust, Rollo closed on the car ahead. Fifty-five, and the off fore wheel in the ditch—but the near one was hub and hub with the back wheel of the black car. Fifty-six—was past it. Fifty-seven—was crowding close on a front mudguard—was clear and spinning ahead.

The end of that wild ride came when, crowded off the crown of the road by the indomitable Rollo, the big black car ploughed into the ditch. But it is given on the word of a Mounted Police Officer who is no longer a junior sergeant that Rollo touched sixty first.

The arrests were easy. Overawed by Rollo's performance, the bank robbers made no fight. Only when the town constable, still honking strongly, arrived on the scene and the moment came for return with the prisoners was it discovered that Rollo was a casualty. No cranking could get a lick out of his engine, nor skillful footwork among the pedals wake a spark in any cylinder.

Sadly they left him and took their captives back to town. Rollo never ran again.

"Ifs" Of The Titanic Tragedy

[*Continued from page* 122]

radio operator, if he "had any ships." Evans replied, "Only the *Titanic*."

He then told Evans to inform the *Titanic* that they were stopped by ice for the night. We already know of Evans' futile attempt to do so. At 11 p. m. those on the *Californian's* bridge saw the lights of a "medium sized ship coming up from the eastward." At the Inquiry, Third Officer Groves told Lord Mersey he was positive that it was a passenger ship. Captain Lord, on the stand, swore that it was a freighter. Lord watched the ship until 11:30 while Groves tried to get into communication with a signal lamp or blinker. They saw no reply. At 11:40 p. m. "her lights seemed to go out, as she turned to the southward." The collision, it will be recalled, occurred exactly at 11:40 and the *Titanic's* head had been swung to the southward in a vain attempt to avoid the berg. They concluded that she, too, was stopped by ice and had put out her lights for the night. It is next to certain that Captain Lord and Third Officer Groves saw the *Titanic* strike the berg, unaware, of course, of what they were witnessing.

At midnight, Groves was relieved by Second Officer Stone and an apprentice, Gibson. Lord went to lie doyn in the chart room about 12:15 a. m., after pointing out the approaching stranger to Stone and instructing him to watch her. Groves left the bridge also, but instead of going to his room, he went to the Marconi room, where he awakened Evans who had just gone to sleep.

"What ships have you got, Sparks?"

Sleepy and perhaps annoyed, Evans replied, "Only the *Titanic*."

Groves went back into the instrument room and picked up the phones; he could "read Morse if sent slowly," but of course he heard nothing for the receiver was dead. It was of the old magnetic type which required winding like a clock and also skilled adjustment. At this very moment the *Titanic* was sending out her urgent SOS calls less than 15 miles away. This is one of the most poignant scenes in the whole drama: Evans asleep, Groves toying with a receiver which, if set into operation, would fairly have screamed the great liner's distress throughout Evans' cabin; 1,500 lives never hung by a more slender thread of the Fates.

Groves listened in the silent headphones; heard nothing so switched out the light, shut the door and went to his room—Atropos had snipped the thread!

At 1:15, Second Officer Stone blew down the speaking tube to the captain and reported that the steamer was going off to the southward and that she had sent up a rocket. Lord asked him, "Was it a company signal?" Roman candles, as well as colored flares, were still in use in 1912 as company night signals.

[*Continued on page* 136]

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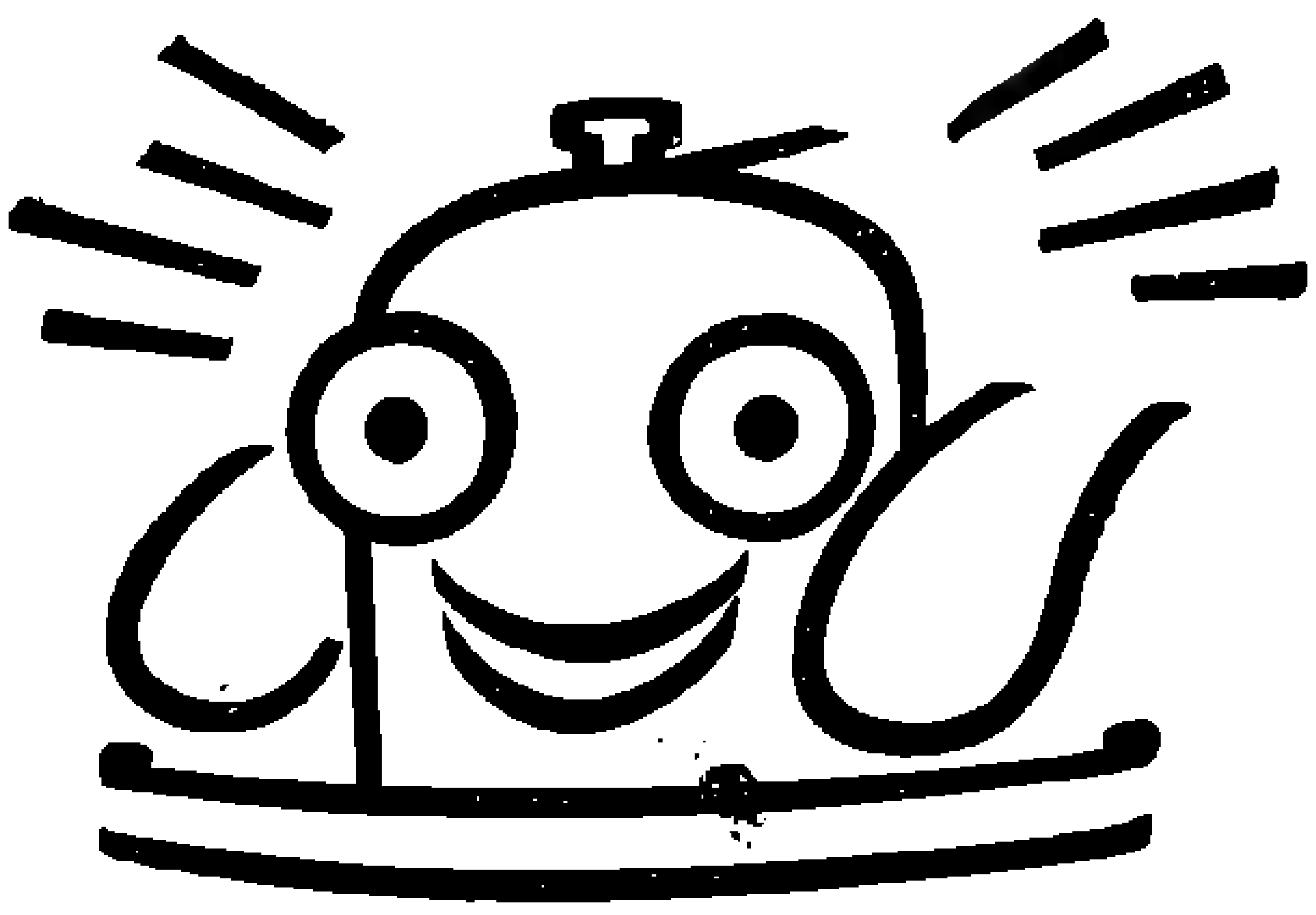

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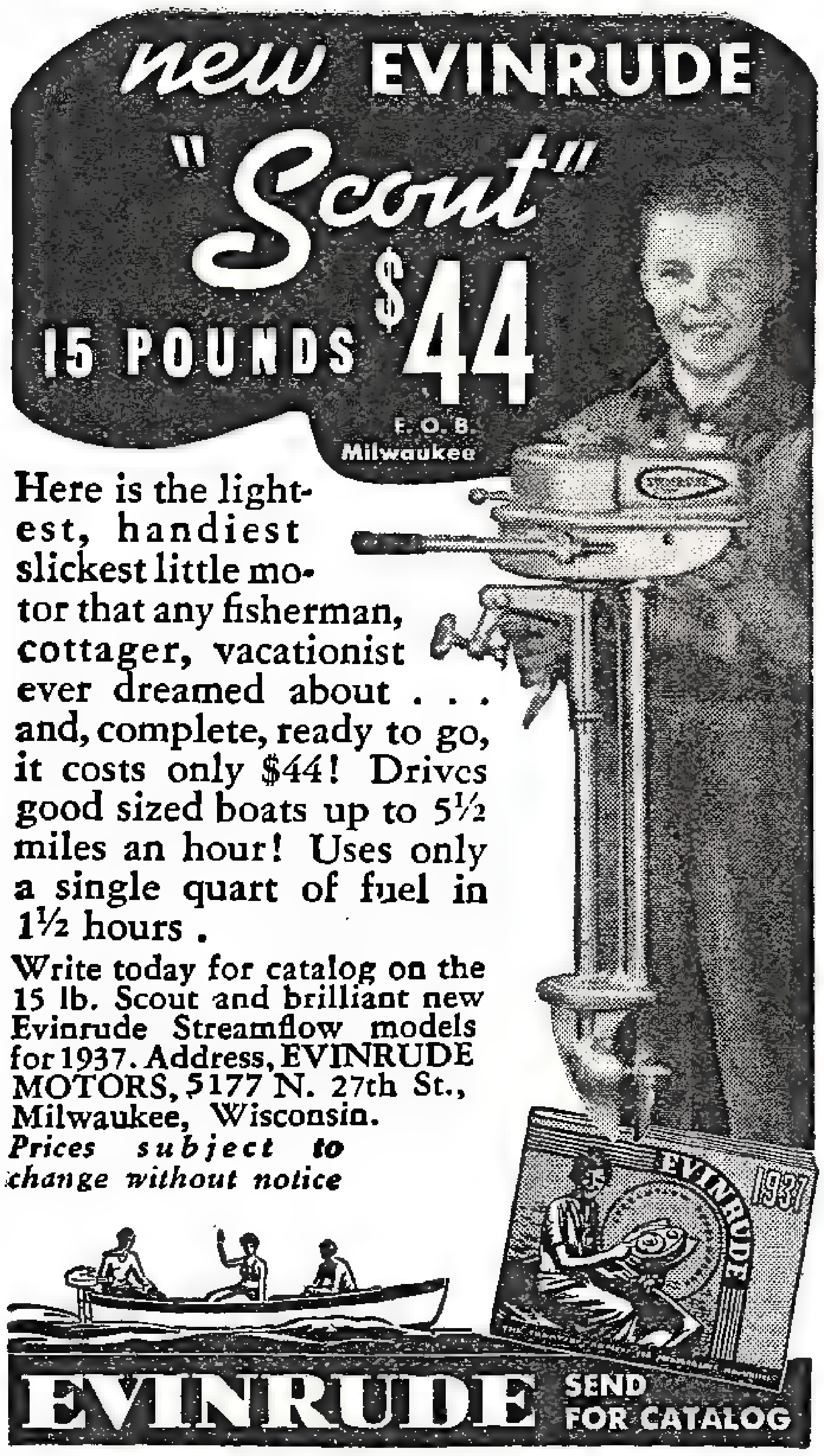

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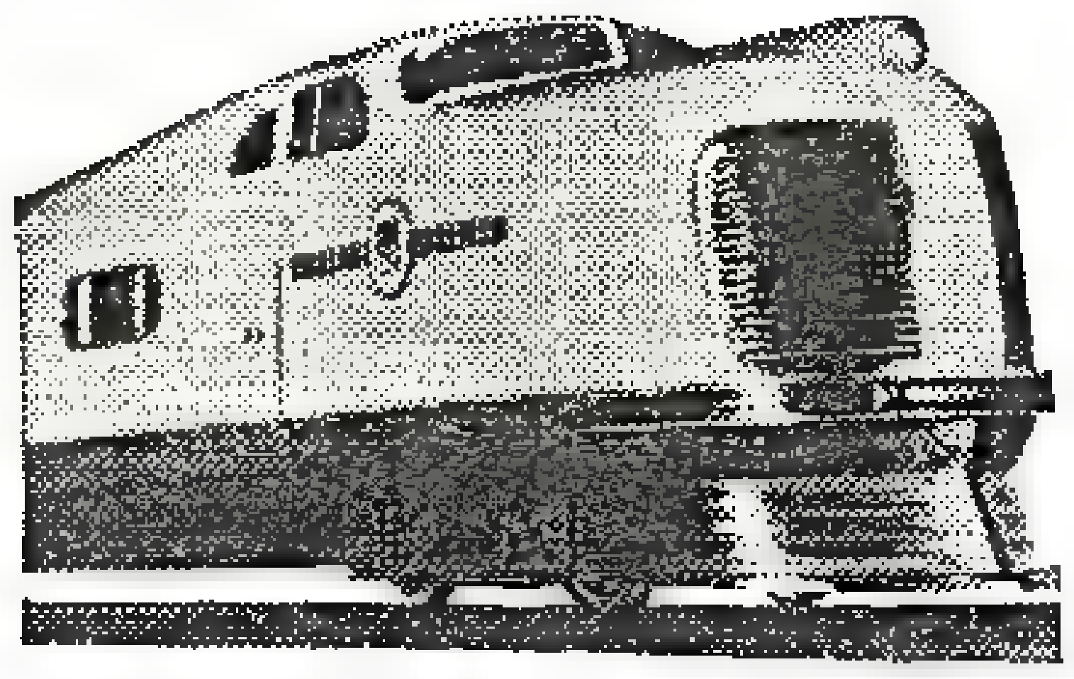

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"Ifs" Of The Titanic Tragedy

[*Continued from page* 135]

Stone replied that he did not know, but that it appeared to be white. (White rockets, in fact all rockets, were and are distress rockets.) He was told to use the signal lamp, but apparently saw no reply when he did so, although Gibson, the apprentice, thought he "saw her masthead light flickering." At 1:20 he remarked that the steamer was going off to the southwestward and added, "Look at her now; she looks very queer out of the water; her lights look queer."

The mysterious ship with her white rockets and "queer" angles seems to have been the sole subject of conversation between the two puzzled men on the bridge of the *Californian.* Stone observed "A ship doesn't fire rockets at sea for nothing."

Altogether they counted eight rockets. Gibson was sent down to tell the captain about them. Lord asked if they were white. Gibson replied "All white."

There was no further response from the drowsy master except, "What time is it?"

"2:05 a. m.," was the apprentice's reply.

As there was no further answer, Gibson returned to the bridge and rejoined Stone. In fairness to Captain Lord it must be added that he disclaimed the speaking-tube conversation with Mr. Stone, and he swore that he had only a dim recollection of someone's coming to his room, but he did not remember any conversation. He was undoubtedly very drowsy and had quickly relapsed into slumber.

On the almost spent *Titanic,* three officers and ten of the crew, later rescued, swore before Lord Mersey, that all through the sinking they had seen "the lights of a ship on their starboard hand four or five miles away." Captain Smith, in fact, directed all boats when lowered to "row toward the light." On the *Californian's* bridge, two puzzled seamen continued to watch the stranger with the "queer lights." At 2:20 a. m. she seemed to go away to the southwestward and "disappeared," they testified. As Lord Mersey pointed out in his summation: "the *Titanic* collided at 11:40; the vessel seen by the *Californian* stopped at the same time. Rockets sent up were distress rockets; the *Californian* saw distress rockets. The *Titanic* sent up eight; the *Californian* saw eight between 12:45 a. m. and 1:45 a. m., the same time. At 2:20 the *Titanic* foundered; at the same time she seemed to 'disappear' to Mr. Stone on the *Californian.* These circumstances convince me that ship seen by the *Californian* was the *Titanic.*" Lord Mersey was also of the opinion that Captain Lord's estimate of 19 miles between the two ships was probably nearer 8 to 12 miles. Captain Lord maintained stoutly to the end that it was an unknown freighter which he saw, and that it could not have been a passenger ship. He did admit he would prefer two radio operators to one, "so as never to miss a message then."

Chief Officer Stewart relieved Stone at 4 a. m.

He seems to have been a man of decision and action; informed of the rockets he went immediately to the wireless room and told Evans that a ship had been sending up rockets during the night. Evans jumped out of bed, rushed to the set. With a sinking heart he heard the details from the *Mount Temple* and the *Frankfort.* While he slept the world's largest ship had gone down less than 20 miles from them, with probably a heavy loss of life. Mr. Stewart returned to the bridge and informed Captain Lord, who hurried to the radio shack and satisfied himself the news was correct. At 5 a. m. they pushed through loose ice toward the position given where the *Titanic* sank.

About 7:30 that morning the *Californian* passed the *Mount Temple.* She semaphored they had no survivors. Shortly afterward they made out the *Carpathia* with her house-flag at half-mast; she was picking up the last boat. By radio it was agreed that the *Californian* was to continue the search for possible survivors while the *Carpathia* hurried back to New York with her rescued.

On the appearance of the *Carpathia,* Colonel Gracie said, "In the midst of our thankfulness for deliverance, one name mentioned with deepest feeling of gratitude was that of Marconi. I wish that he had been there to hear the chorus of gratitude that went out to him for the wonderful invention that spared us many hours, and perhaps days of wandering about the sea in hunger and storm and cold." By an odd coincidence Marconi happened to be in New York waiting to return to England on the *Titanic.* Informed of her loss, he said it "seemed almost impossible."

The Monday New York papers carried very little news on the new liner other than the report that it had struck a berg and might need assistance to transfer her passengers. Not until Tuesday, or more than 24 hours after the disaster, did the full news reach the world. The *Carpathia* was silent; her apparatus had a range of barely 150 miles. Parts of two entirely unrelated messages: "Are all *Titanic* passengers safe?" And another, from the SS. *Asian* that she was "300 miles west of the *Titanic* and towing an oil tank to Halifax," were garbled together by an over-zealous operator into the famous and reassuring "all *Titanic* passengers safe, towing to Halifax."

With the first news of the sinking of the *Titanic,* every amateur in America camped on his key and added to the bedlam. Anyone who could haltingly copy down a few incoherent scraps of conversation over the air, pieced them together with the liberal help of his imagination. The news-hungry journals gobbled them up as first class, bona fide "news."

Tuesday most of the New York papers devoted their first ten or twelve pages to the disaster. The Turco-Italian War went on the back pages. The *Olympic* sent the relayed list of the first class survivors to Cape Race. When daylight came, she passed out of range as she hurried off to the eastward. The *Carpathia* with her 150 mile range was

[*Continued on page* 138]

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"Ifs" Of The Titanic Tragedy

[*Continued from page* 137]

isolated in deep silence. Crowds gathered in Times Square to read the latest bulletins. The White Star offices were besieged by sobbing, hysterical relatives of *Titanic* passengers. President Taft was deeply concerned over the fate of Major Archibald Butt, his military aide and a close friend. Two fast scout cruisers, the *Chester* and the *Salem,* were dispatched to search the spot where the *Titanic* went down and also to intercept the *Carpathia* so as to radio in a full report of the wreck and a list of the rescued. No sea disaster had ever attracted such world-wide anxiety.

Thousands of messages piled up at the shore stations. At the solicitation of the American Marconi Company, the government ordered all radio stations north of Hatteras closed down, leaving only those at South Wellfleet, Siasconsett, Sagaponack, and Seagate open; they were to handle *Carpathia* traffic exclusively. The order was enforceable only on commercial stations, the amateurs blithely continued "on the air." The situation became so desperate that Newport Radio, a naval station, "requested that every station in range to keep out" until a list of the survivors could be obtained from the *Chester*. Department of Justice men went to work tracing the origin of false and misleading messages.

The *Carpathia* continued on to New York, with Cottam her sole operator, putting in the most harrowing three days of his life. Every station on land and see was calling him. Handicapped with an inadequate set, he had 712 survivors' names to get off, and besides, the hundreds of messages filed by them, to say nothing of his official traffic and the answering of innumerable communications from other ships. He was at the key without sleep or rest from Sunday morning until some time Tuesday night or Wednesday morning, when he collapsed over his key. He awoke at dawn on Wednesday and began again, continuing all day except for meals which were brought to him. Then Bride was carried up from the hospital to help Cottam, who was "getting queer." Bride, whose feet had been frozen in the icy water on the raft, could not stand or walk, but, propped in a chair, he could work a key. He began to get off the list of the third class survivors to the U. S. S. *Chester*. He and Cottam were forbidden by Rostron to send anything other than official and passengers' messages, with which they were already swamped. Unable to transmit a word, Carlos Hurd of the *St. Louis Post-Dispatch,* a vacationing newspaper man who happened to be aboard the *Carpathia,* and his wife gathered all details for one of the greatest triumphs of journalism. As the *Carpathia* neared port on Thursday he dropped his article to a tug of the New York *World,* then a sister paper of the *Post-Dispatch,* and there were "extras" out with his story by the time the survivors landed in the evening. Hurd received $1,000 bonus and had three weeks added to his vacation.

The scene at Pier 54 will never be forgotten by those who were there that night. The gay decorations put up to welcome the new liner had been quietly removed. Over 2,000 pier passes had been issued to bonafide relatives, police, customs men, Salvation Army workers, nurses, doctors, and relief workers. The streets were roped off and guarded by hundreds of police. Twenty ambulances stood in solemn ranks. There were city and government officials, subpoena servers, and coroners. The air was electric, but strangely quiet except for suppressed excitement and quietly sobbing or crying women. Many had come, hoping against hope, that someone near and dear and missing from the radio lists of the survivors, might yet descend from the gangway of the *Carpathia*. A woman passenger was the first to step ashore, followed quickly by the other rescued, many still showing marks of suffering or exposure. With characteristic American liberality toward distressed humanity, every care and attention was lavished on the survivors. Customs formalities were waived, relief workers took charge of the indigent and homeless, the railroads offered free transportation to immigrants who had lost all in the disaster.

An ambulance stretcher bearer was waiting for Bride. Marconi Company officials went aboard looking for him. He was still at the key with over a hundred unsent messages piled up in front of him, entirely oblivious that the *Carpathia* had docked and that his work was over. His face was colourless, his cheeks sunken and his eyes shone as if with fever. He was soon ashore and under medical care.

The Sunday after the disaster was observed throughout England as a day of mourning. The memorial services at St. Paul's were deeply impressive.

There was the usual aftermath of investigations; one by the United States Senate and later another by the Board of Trade in London under Lord Mersey, who found the "Loss due to collision with an iceberg brought about by the excessive speed at which the ship was navigated." To this was added, "Low bulkheads, insufficient subdivision and lack of an inner skin" as contributory causes.

The rescued represented 32 per cent of the total who had sailed with her, passengers and crew. Sixty-three per cent of the first class, 42 per cent of the second class and 25 per cent of the third class had been saved. Only 23 per cent of the crew survived their ship. Of the 1,662 men, passengers and crew, only 315, or 19 per cent, were rescued. Of the women, 77 per cent were saved and of the children 49 per cent. The second and third class men were hardest hit; out of 160 second class men only 13, or 8 per cent, were left; while 55 out of 454 third class men, or 12 per cent, reached shore.

Other steamship companies hastily ordered additional lifeboats, the slumbering British Board of Trade was shocked into revision of its 18-year-old life-boat requirements, written in the years when

[*Continued on page* 140]

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"Ifs" Of The Titanic Tragedy

[*Continued from page* 139]

10,000 tonners were big ships. An International Ice Patrol was organized and has been continued to this day.

The value of wireless as a life saving agency at sea had been dramatically demonstrated. As Marconi said, "If there is one lesson, above all others, to be drawn from the *Titanic's* loss, it is the necessity, or at least the desirability, of having two wirelessmen on every ship equipped with wireless apparatus—as almost all passenger ships and many freighters are now equipped. Of course, owners object to the expense of a second operator, when one is sufficient to send out all calls likely to originate on a given ship. But as a matter, not merely of humanitarianism, but of mutual protection to all ships, there should be some sort of enforceable international agreement, a compulsory provision of two operators on every ship having wireless equipment."

Lord Mersey, in his findings, also recommended "continuous watch by trained operators."

In 1935 the writer visited Jack Phillips' memorial at his birthplace, Godalming, in Surrey. Popular subscriptions from the entire world were used to erect a memorial cloister. It was designed by Thackeray Turner and unveiled by the High Sheriff of Surrey on April 15, 1914. It is a peaceful, arboreal retreat on a quiet country road next to the venerable and gray parish church. The cloister consists of four ivy-covered walls and of oaken columns inclosing a lily pond set in a bordering of ferns and flowers. On the back wall the ivy has been kept clear from a tablet which reads:

DEINDE
LIBERA FIDELIS
This cloister is built in the memory of
John George Phillips
a native of this town, Chief Wireless Telegrapher of the ill-fated TITANIC. He died at his post when the vessel foundered in mid-Atlantic on the 15th day of April, 1912.

The site for the cloister was well chosen, and the memorial has been beautifully cared for since the unveiling. One carries away a memory of simplicity, greenery, and peace, so out of keeping with the circumstances and locale of Jack Phillips' death—the grey, ice-chilled waters of the Atlantic on a somber, starlit night in April.

From his sister, who still lives at Farncombe, Godalming, the writer learned that Jack was an only living son, born at Farncombe, April 11, 1887. In his early youth he sang in the Godalming Church choir and attended Godalming Grammar School. Then he entered the Post Office to learn telegraphy, later going to Liverpool where he entered the Marconi School. Mr. Blinkhorn, his technical instructor, still with the Marconi Company, in London, remembers Jack Phillips as a "pleasant boy, well-spoken, good-tempered, and friendly."

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Building Lilliputian Railroads

[*Continued from page* 39]

have their ideas as a background to improve upon. Perhaps you join the local model club, or organize one yourself, after writing the model railroad magazine to find out who in your city is also a model railroader.

Before you start to buy, you must choose a gauge. Gauge is the distance between rails, and as this distance in the model is a definite fraction of the 4′ 8½″ gauge of real railroads, it determines the ratio to which you will scale down all of the rest of your railroad. For accurate scaling down, along with attention to detail, is the essence of this model business.

By far the most popular size is 0-gauge. This is 1¼″ between inside rail faces, 1/45 the distance of the real thing. Many modellers stretch a point and use a scale of ¼″ to the foot with this gauge, thus modelling to 1/48 the prototype. A newer group uses the more exact scale of 17/64″ to the foot, exactly 1/45 the size of the prototype. There are reasons for both choices, the biggest reason, perhaps, being what your friends are doing, in what scale the parts for what you are planning to build are most easily obtainable, and whether you are the kind who likes to be accurate for the sake of accuracy itself.

Since in 0-gauge a locomotive and tender are nearly two feet long, a Pullman 21 inches, a freight car 11 inches, the average basement is rather lacking when it comes to space for a reasonably realistic right of way on which trains of anywhere near as many cars as the original can operate. To get around this objection there have been developed two smaller gauges which allow much more trackage and, at the same time, much smaller trains in a given space.

The more popular of these smaller sizes is H0, standing for half 0. Like model railroading itself, this originated in England, and has only become popular here during the last two years. Millimeters are used for measuring, the gauge being 16.5 mm. (approximately 21/32″) and the scale 3.5 mm. to the foot. With passenger cars 11 inches long you can truly run a Pullman limited around your basement without the engine nosing the observation car.

00-gauge is slightly larger, running on 19 mm. track gauge and using a scale of 4.0 mm. to the foot. The advantage is largely in locomotive construction, as the space for the motor is not so restricted as in H0. The space advantage is still there, although not quite so marked. It is hard to tell what will eventually develop in these smaller gauges for they are new and the manufacturers are still experimenting with designs for parts and kits. Special rulers convert feet and inches directly into the measurements for these metric scales.

Your gauge finally settled upon, you start building, preferably a freight car, as it's an easy project that's not too difficult for the beginner

[*Continued on page* 142]

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Building Lilliputian Railroads

[*Continued from page* 141]

but still furnishes one piece of equipment. Next you pick a locomotive. While you'll most likely want to build the biggest and most powerful looking engine you've seen, if you profit at all by the experience of others you'll start on a small type suitable for either short passenger or short freight trains. Your choice will have few driving wheels, so that it can easily negotiate the sharp curves, far sharper than scale, that are needed to get around your right of way. You'll consider, too, that on your short road you can't pull very long trains and a big engine would look out of place.

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Some 60 model railroad clubs meet in the larger cities. Because the average basement or attic furnishes so little room, and there are so many phases to model railroading that many hands can work together on the same layout, many of these clubs have rented large spaces in centrally located buildings, often on railroad property, and have set up club railroad systems. These are usually in 0-gauge, because space permits this size and the larger equipment better withstands lots of use and abuse.

The New York Society of Model Engineers runs the oldest and best known of these club railroads, the Union Connecting Railroad, in the Knickerbocker Building on 42nd St., just off Times Square. Several thousand feet of track, realistic scenery, including bridges and viaducts, standard railroad signaling apparatus, rows of cars and locomotives, roundhouse, yards, and stations combine to give visitors the impression that they're viewing the capable railroad facilities of some Lilliputian country. The staff, too, is railroad-like. There are officers, an engineering staff, and an operating staff. The road is run by timetable under the direction of a dispatcher and trainmaster, and the Brownie system of demerits is used to make up a seniority list by which jobs are awarded.

In Springfield, Mass., Oakland, Calif., Milwaukee, Wis., Portland, Ore., New Haven, Conn., St. Paul, Minn., Los Angeles, Calif., and Maywood, Ill., similar club systems have been built during the last few years, while in many other cities, including Cincinnati and Cleveland, Ohio, Detroit, Mich., Buffalo, N. Y., Kansas City, Mo., Boston, Mass., Washington, D. C., and Baltimore, Md., other "Union" railroads are under way. Because its members are too scattered the largest club of all, the Model Builders' Guild of Chicago, has no club railroad, but holds bi-weekly meetings for the exchange of ideas and to listen to outside speakers.

To bring some kind of generally accepted standards into technical matters such as scale and gauge, dimensions of small parts and working dimensions of switches and curves, the National Model Railroad Association was formed in 1935. Several regional associations, mostly affiliated with the N. M. R. A., foster local work along the same lines.

The National Association and the local clubs also promote fellowship. Regardless of vocations, religion, and politics, model railroaders have one uniting interest, one common subject, the source of endless conversation and debate. They meet first, perhaps, by mail, perhaps by hearsay, and an introduction is like a meeting of old friends. District meetings, sectional displays of equipment and inter-club interchanges when equipment from one city is brought en masse to run on the rails of another city's club railroad are becoming common. All add to the fascination and fun of one of the most interesting and comprehensive of hobbies.

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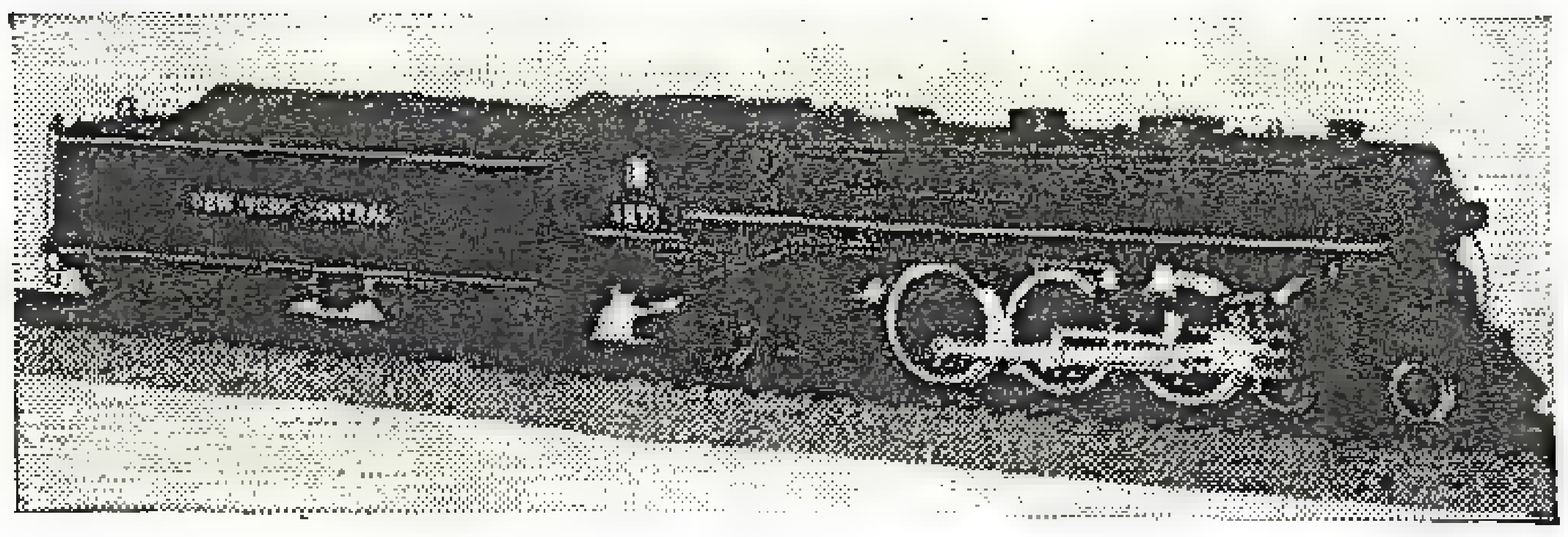

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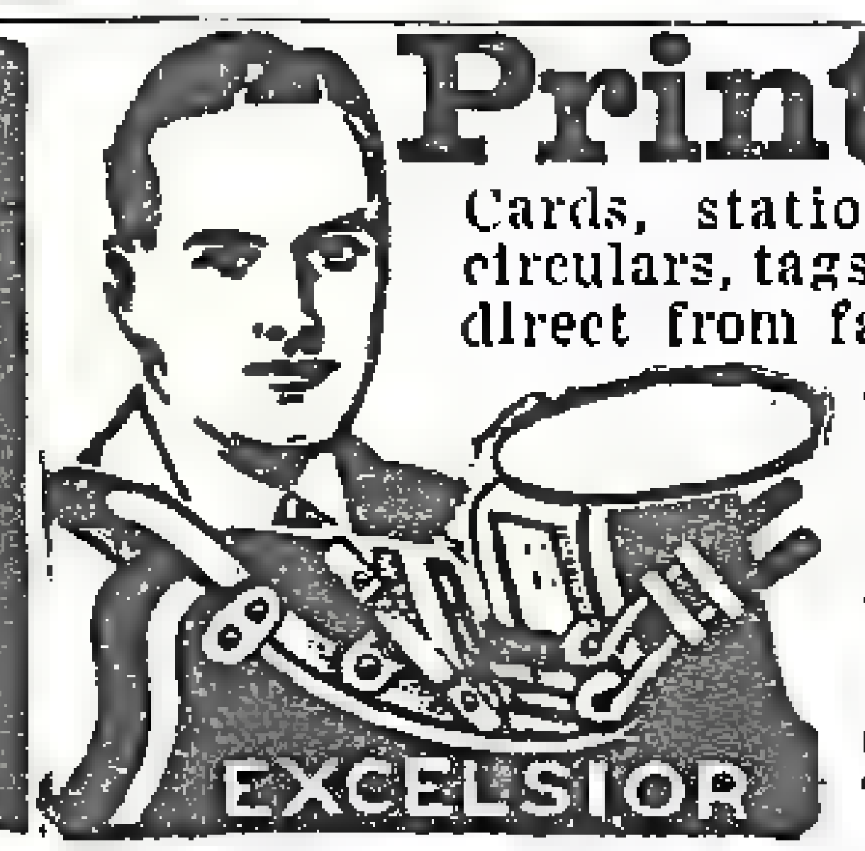

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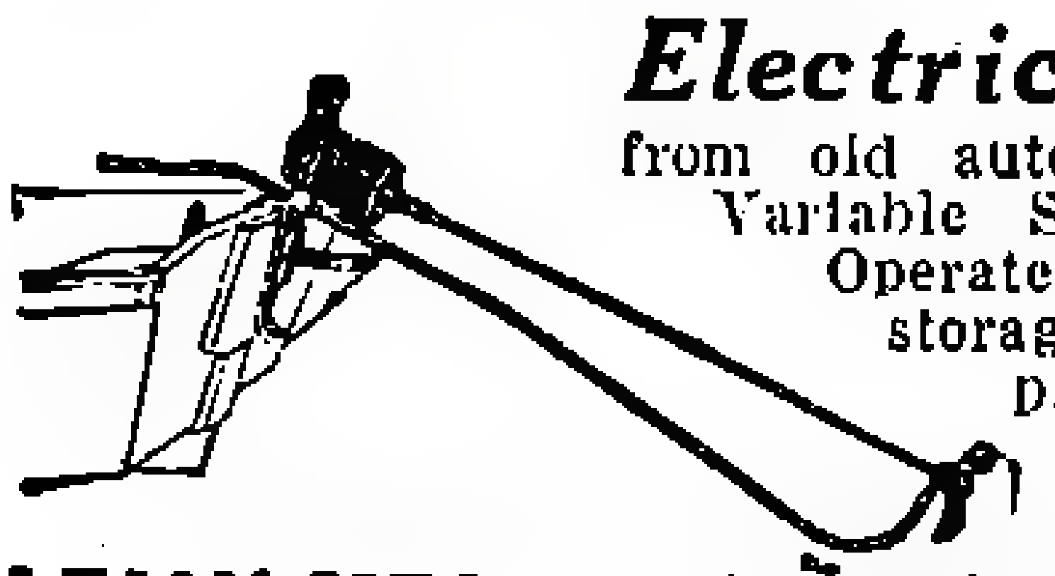

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Just Another Gadget

[*Continued from page* 33]

and J. C. Hershey, with an idea for an auto lock. For nine years they offered the device to motorcar makers and eventually it caught on. Today the auto lock is standard equipment on half the cars produced. When the two brothers sold their rights, according to their attorney, they cleaned up more than $1,000,000 each.

Recent annals of Chicago inventors yield still another romantic tale involving a "mistake" which turned out $10,000 to the inventor's good. After devising an automatic pencil, which later became very popular, C. R. Keeran, the inventor, had an idea for an improvement. Papers were drawn up and a patent attorney prepared to rush to Washington. Keeran hurried home to make his required model, but in his haste the dies got in wrong. The result was something not expected, but so valuable that the manufacturer paid the $10,000 for a license to use this accidentally discovered feature.

Rich in human interest, too, is the experience of another woman inventor, Mrs. Anna J. Greenwich. With her husband and four children, she was for a time on relief in Chicago. Faced with the loss of their home and beset by creditors, Mrs. Greenwich had one hope, a tiny hair curling device, which she had earlier patented. Money was borrowed from a relief agency to help find a market and when introduced to the world by a large mail order house the hair curler went over with a bang. Out of her first profits Mrs. Greenwich wrote a check to cover the relief funds she had received.

Towering above a huge manufacturing plant in a Chicago suburb, a tall chimney bearing the name "Benjamin" constitutes a fitting monument to a once humble inventor. When Reuben Benjamin set out from Iowa State College he had two ideas on which he worked long in a dark basement. One was a light socket which could carry a cluster of lamps without the need for wires to each globe. The other was a swivel screw shell attachment by which extension cords could be connected to a circuit without twisting the cord into a tangle.

When Benjamin died in 1934 he was rated among the nation's most prolific inventors with some 400 patents to his credit, and the big factory where industrial lighting equipment is made is a testimonial to his business ability.

In Harvard, Illinois, another factory chimney recalls the labors of a poor tinsmith, Charles E. Hunt, who, a half century ago worked out in his basement shop on Main Street an idea for a hay fork with an automatic tripping device, by which a farmer could fill his barn from the ground without an assistant. Five words tell the rest of the story: The business grew and grew.

At Knoxville, Tennessee, still another factory chimney is a tribute to a former clerk in a Government Weather Bureau station. Scientific apparatus employing themostatic principles constantly got out of adjustment and called for repairs. When that clerk, W. M. Fulton, sought the trouble, he decided it was due to the rubber bellows commonly used to permit expansion when the devices responded to pressure. Fulton devised the sylphon, a collapsible metal bellows, later adopted as a vitally essential feature of electric refrigeration equipment. It is used, also, to raise radiator covers on motor cars, when the engine gets overheated. And that former Government clerk is now a wealthy man in Knoxville.

Another chapter in the saga of humble inventors whom fortune served well concerns Louis A. M. Phelan, once a Chicago building manager. In odd moments, Phelan worked on an idea for an electric switch employing an inert gas to supplant open electric contacts on electrical control apparatus. A glass tube, scarcely bigger than one's little finger, called the mercury contact switch, was the result.

For years Phelan made these in a back room and peddled them wherever he could. Even his attorneys refused the share in the business which he offered to liquidate their bill for legal expenses. Just at the right moment the oil burner appeared with a demand for a dependable switch in a ticklish position. And, to shorten the story, in 1930, when all the world suffered from a "depression," Phelan sold his mercury contact switch to a Minneapolis concern for $1,000,000.

Inventors everywhere are finding the present interest in coin-operated vending and amusement devices a rich field for exploitation. Beginning in 1930 production of pin and marble games grew overnight into an industry of amazing proportions. Twenty of the 25 factories making amusement tables and other coin machines are located in Chicago, where in 1935 their business totaled over $20,000,000.

New games, new designs, new mechanical features are constantly demanded, according to C. S. Darling, secretary of the National Association of Coin Operated Machine Manufacturers. Hundreds of inventors, he stated, are relied on to produce the "best sellers" that keep this depression-born business booming.

A shooting gallery utilizing the photo-electric cell is a recent development. Pulling the trigger of a rifle, the marksman sends a beam of light to the moving target. The accurate shot hits a photo-electric cell on the bird, which falls over, automatically registering and totaling the score on an illuminated panel.

One unusual award for an electrically controled coin machine has come to Alexander Flaunn, of Bridgeport, Conn. Flaunn patented a vending machine which cooks and seasons frankfurters, places them in an automatically slit toasted roll, then transfers the sandwich to a sanitary wrapper which mechanically closes around the contents and delivers it.

In 1930 the *American Journal of Sociology* included this machine in its annual list of inventions and discoveries which appear to hold the greatest possibilities for affecting the future course of

[*Continued on page* 146]

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Just Another Gadget

[*Continued from page* 145]

civilization. For the inventor that honor is comparable to making the "All-American" in sports.

But other big problems are awaiting solution by inventors. At the last national convention of heating, ventilating and air conditioning engineers in Chicago, part of an afternoon was devoted to discussion of how to keep frost off windows in air conditioned rooms. They know what makes the trouble, but await an inventor to stop it and get rich.

And other inventors soon will have to be producing devices sure to be needed in hospitals and sick rooms where conditioned air will be used in treatment of disease. Research in this virgin field has just been launched at the University of Illinois College of Medicine.

After a decade or two spent almost exclusively in amusing the world, radio is now being put to work in earnest. Aside from sending photos around the world by air, it is already doing such astonishing things as killing bugs, catching burglars and curing fevers.

For instance, Dr. Willis R. Whitney, of the General Electric Company in Schenectady, has put radio to use in curing lame muscles and joints. The radio waves heat the body and dissolve deposits of calcium, a hard, lime-like substance which sometimes gets into the smooth body "oil" that ordinarily lubricates the joints. The ailment is technically known as bursitis, and sometimes called "sand in the gears." It is an extremely painful disease. Inventors can be certain radio wants to do other things with their help.

In the fast strides being made in television, Dr. Vladimir Zworykin, of the Westinghouse research laboratories in New York has developed "bottled television," a new type. His device is a bottle-like cathode ray tube which forms the receiver. The broadcast pictures appear on the bottom end of the tube, and from there are projected on a mirror in view of the spectators. It looks very simple—now that it has been done.

Stratosphere exploration has shown the need for a new type of engine, which can operate in thin air where gasoline or steam are useless. Utilization of cosmic rays in the service of man is still another task for the inventor of the future. And how easily this list could be lengthened!

Studying patent records for the ten-year period from 1916 to 1925, Prof. Lowell J. Carr, of the University of Michigan, determined that approximately 195,500 inventors had taken out patents in that period. This means one inventor to about every 650 persons in the country. Carr found that one-seventh of the patentees produced about three-fifths of the patents and he ventured the suggestion that only a small percentage of these—"some estimate as low as one per cent"—had any practical utility.

Some scholars hold that there should be a moratorium on discovery and invention until society absorbs what we already have and into this discussion a patent attorney injected a new note.

"It is useless to call a halt," he said, "and even more so right now. The huge tax bills facing the nation are an urgent inducement to more inventions. As payrolls sag under tax burdens for social security and other purposes, manufacturers will more and more be forced to substitute machines for men."

What an optimistic prospect that suggestion opens up for the inventor!

Called "The Lady Edison"

[*Continued from page* 58]

resident of New York City for about fifteen years.

The creative faculties of Miss Henry began to show in early childhood. As a very young girl she exhibited a gift for painting and music, as well as a marked talent toward letters. From childhood she manifested inventive ability, in that she was continually pointing out changes and improvements for everything with which she came in contact. As regards most of these childhood ideas, however, it should be said that she had an idea simply of what could or should be done, without having worked out the mechanics for putting the ideas into practice. But this inventive trait, early evidenced, was to ripen into the foremost feminine inventor of all time.

Inventors almost invariably create things in the same field or art in which they move, but Miss Henry's career is an exception to this rule. Being typically feminine, some of her inventions naturally relate to the needs of women. A hair curler, a vanity case, a rubber sponge soap holder, and a water faucet which can always be shut off with ease, may be mentioned as typical examples of things she has devised for women.

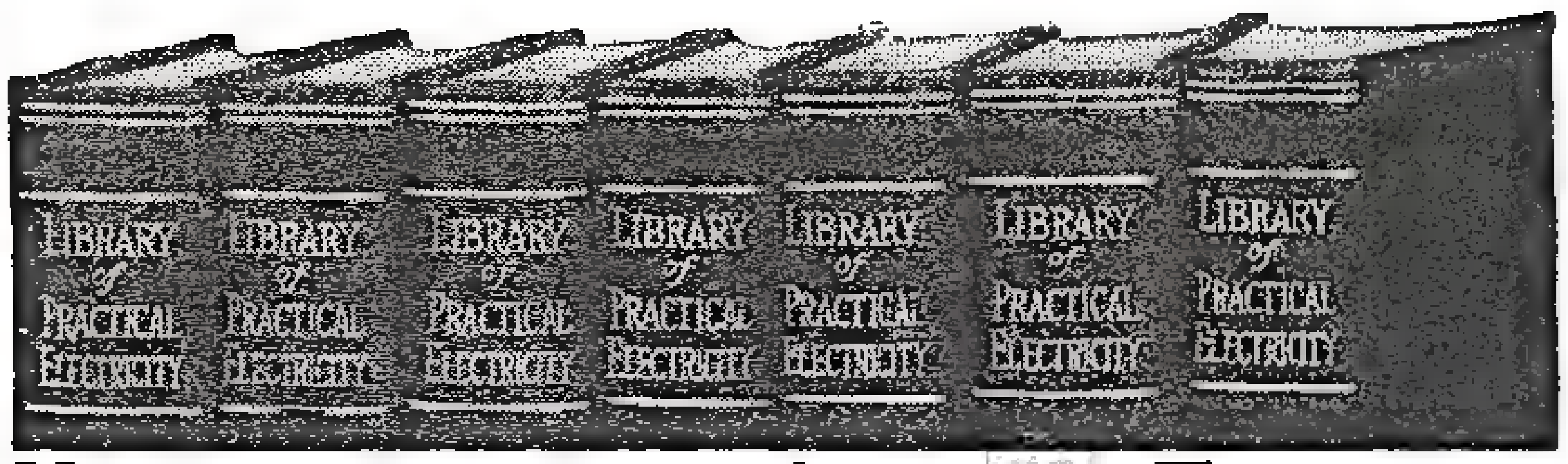
Indicating a broad technical skill, Miss Henry turns her ability from inventing a double stitch sewing machine, thereby doubling the speed possible on the conventional machine, to inventing an improved means of closing a doll's eyes without placing it in a reclining position, both within a short time period.

On October 11, 1934, Miss Henry made application to the patent office on a movable eye structure for dolls. On October 18, 1934, Miss Henry made an application to the patent office on a device far afield from the eye structure. This time she had developed a means of doubling the speed of a "double stitch sewing machine."

The object of Miss Henry's work on this device was to produce a machine not only capable of higher speeds than the conventional type, but to make one which would produce the chain stitch by use of rectilinearly reciprocating needles.

Having eliminated the bobbin found in the usual machine, Miss Henry's invention makes possible the manufacture of a machine less expensive and less complicated than the conventional type.

[*Continued on page* 148]



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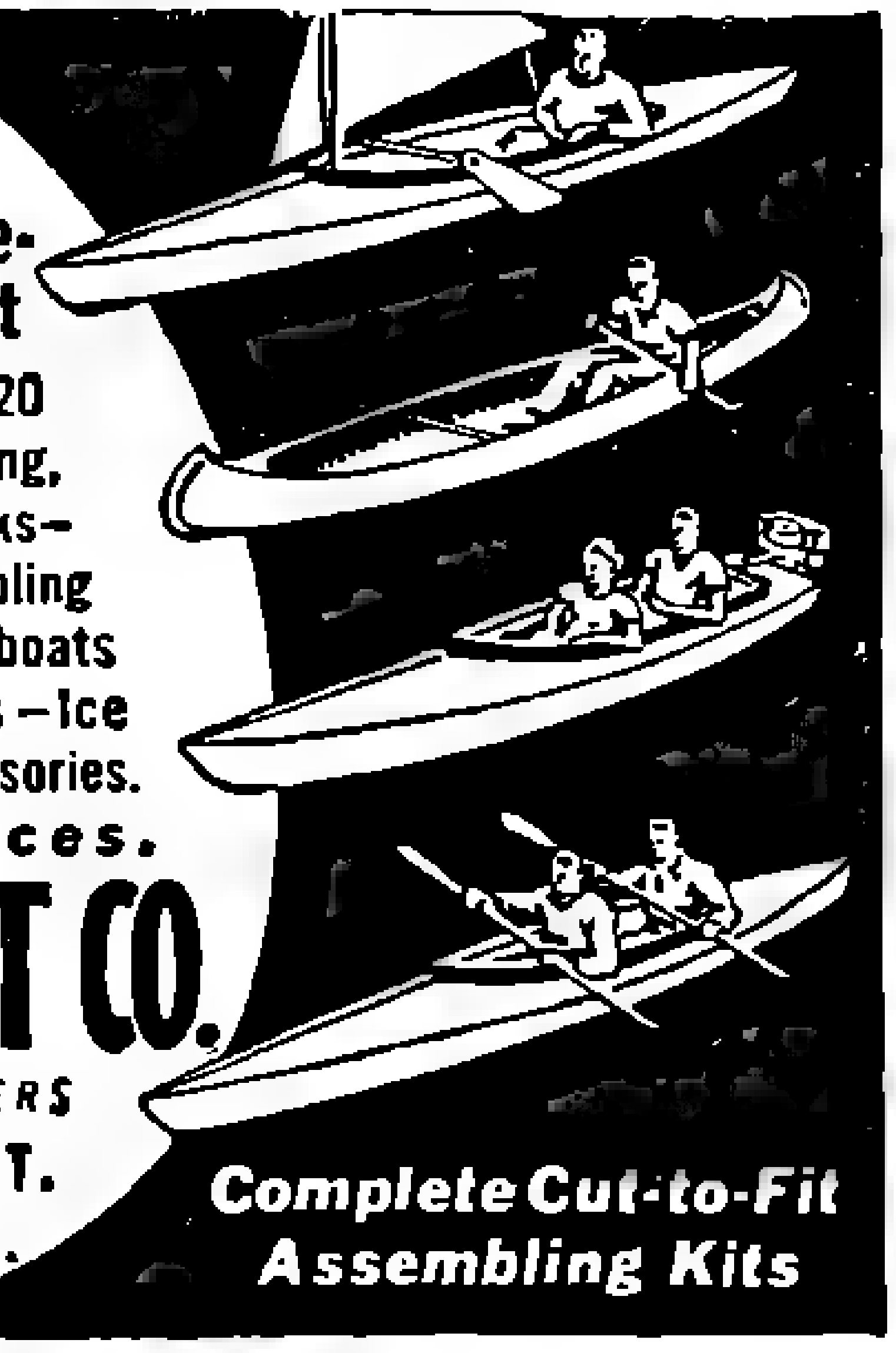

Called "The Lady Edison"

[*Continued from page* 147]

Beside having invented a machine capable of about double usual speeds, her device, having no bobbin, makes possible the use of a smaller diameter thread without danger of breaking, because of short length loops in the sewing operation.

In 1930 Miss Henry made application for a patent covering a duplicating attachment for typewriters whereby several copies could be made at the same time as the original, without the use of carbon paper.

The device, suitable for attachment to any typewriter, would make a maximum of four "original copies," each the result of a standard ribbon between sheets, according to patent issued December 1, 1936. The attachment is entirely separate from the rest of the machine, and may be removed when desired.

When copies are not desired, the device may be taken out of service without affecting the typewriter. These original copies are especially useful in courts where carbon copies are not considered as competent evidence.

One of her inventions for women was the snap-on parasol. Through this novel idea milady may have an umbrella to match any frock. The frame or handle of this umbrella is not limited to one cover but you may have any number and in new colors as fashion dictates. One can take off the cover to dry, and the cover and frame both benefit. If the cover becomes soiled it may be snapped off and dipped in gasoline. It is indeed a versatile umbrella, simple, clever, and practical —a "snap" and off comes the cover; a "snap" and on goes a new one.

The radio and even toys and dolls have not escaped Miss Henry's quest. Her patented method of making toy animals and dolls with inflatable rubber inner tubes replacing the old interior stuffings, has revolutionized this particular business. The idea lends a life-like reality to the toys and greatly reduces their weight. Large dolls, formerly weighing as much as five pounds, are greatly reduced in weight under her method of manufacture. The dolls or animals may be inflated or deflated at will by means of a bulb concealed in the dolls or animals.

It has been stated that Miss Henry is "psychic" because inventions appear to her suddenly, complete in almost every detail. Instead of working out her inventions step by step, as most inventors do, they seem to appear to Miss Henry right out of the air, as a completed vision. She then directs workmen in making the product, often designing machinery to accomplish this task. After inventing the rubber sponge which holds a cake of soap, she invented a machine which would cut the opening in ten thousand sponges a day. Lest one suppose that all Miss Henry's inventions are but the result of happy thoughts, however, it may be stated that the model for the Protograph, including time and money expended in its perfection cost over $20,000. All of which bears out Thomas Edison's famous statement, "Inventing is the hardest kind of work."

Cultured, a lover of nature, poetry and art, Miss Henry is not the type one might expect to find leading the ranks of women inventors. "I invent because I cannot help it—new things just thrust themselves on me," Miss Henry explained in an interview at her residence in New York. And it is about as good an explanation as can be given as to why a woman—and this woman in particular—should indulge in such an unusual profession.

Miss Henry possesses a rare combination of business acumen and inventive ability, which is so necessary to the successful inventor. But Miss Henry is not a cold, business centered woman. Although her program is crowded, she is ever mindful of the human side of life. "My friends and the press help me win," she says. Appreciative of the kind words and faith her admirers shower on her, she in turn passes kindnesses along. One of her original lines reads: A kind word is a flower, placed by a friend in the chalice of a heart.

Migraine Cure Claimed

Many persons with migraine, or "sick headache," may find quick relief in a drug known as ergotamine tartrate, reports Dr. Mary E. O'Sullivan of Bellevue Hospital, New York City. She has by this treatment saved 89 migraine patients from "39,000 hours of suffering in the last two years," she declares.

The alkaloid, ergotamine tartrate, is not a cure for migraine, the woman physician emphasizes, but it has brought relief to all but eight out of 97 patients who have been treated. It completely checked 1,042 headaches in the 89 patients discussed.

The drug is injected under the skin by the physician, or it may be taken, somewhat less dependably, in tablet form. It should not be taken except under a doctor's orders.

"Any disease that will incapacitate an adult, interfering with his work for a day or more from one to four times a month is a definite economic liability," says Dr. O'Sullivan. She and others are at work on the cause of migraine under a grant from the Josiah Macy Foundation.

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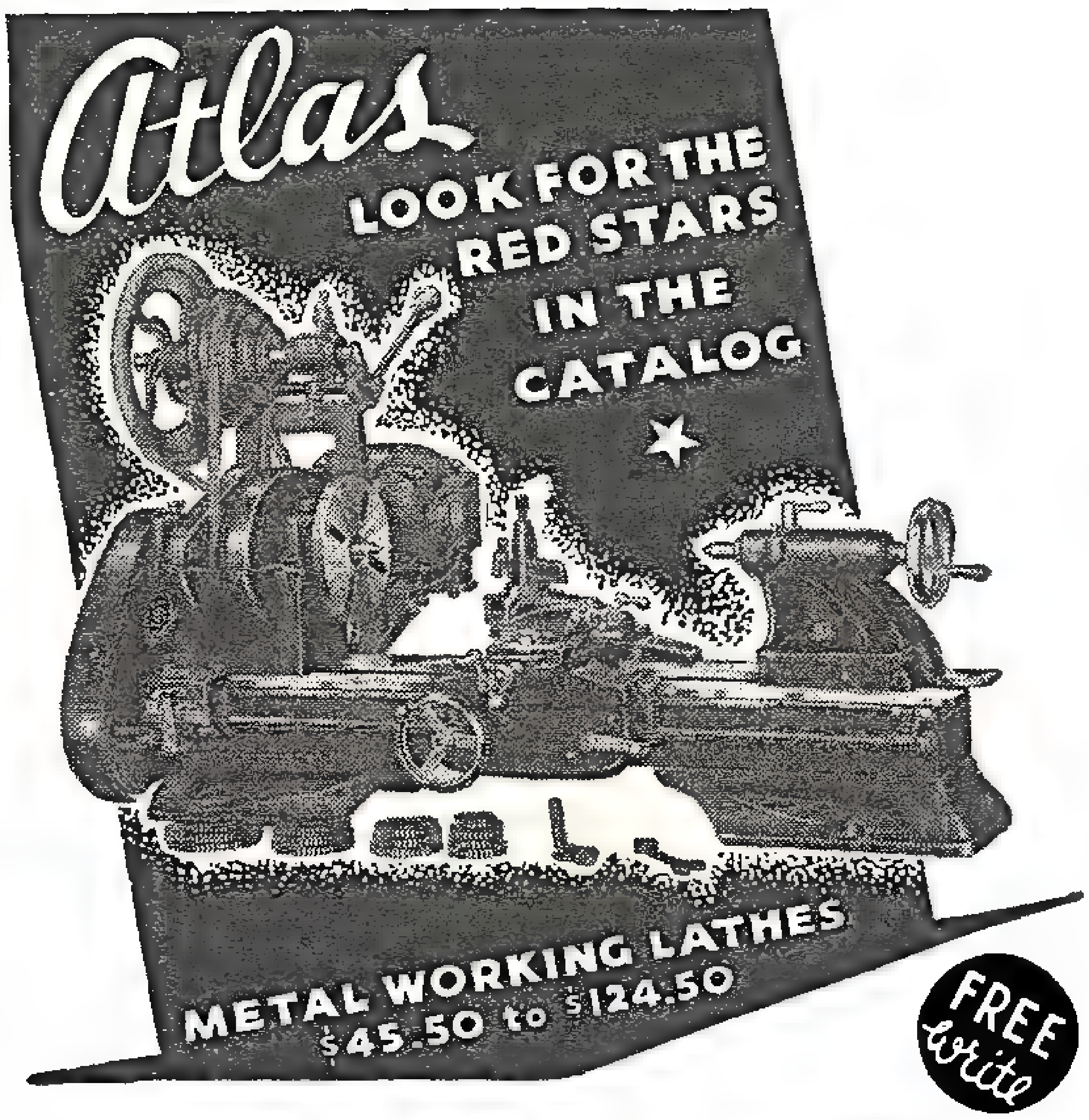
"Automobile instruction for every junior and senior high school pupil is coming," declares William McAndrew, former superintendent of schools in New York and Chicago, writing in the Baltimore Bulletin of Education. In State College, Pa., high school students are taken out four at a time and given expert guidance in eight hours of driving and 24 hours of concentrated observation, he points out.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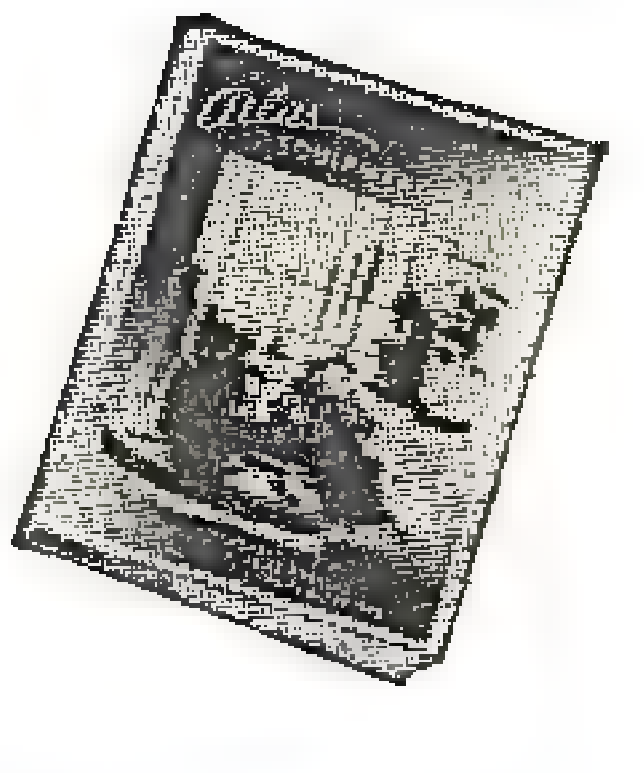

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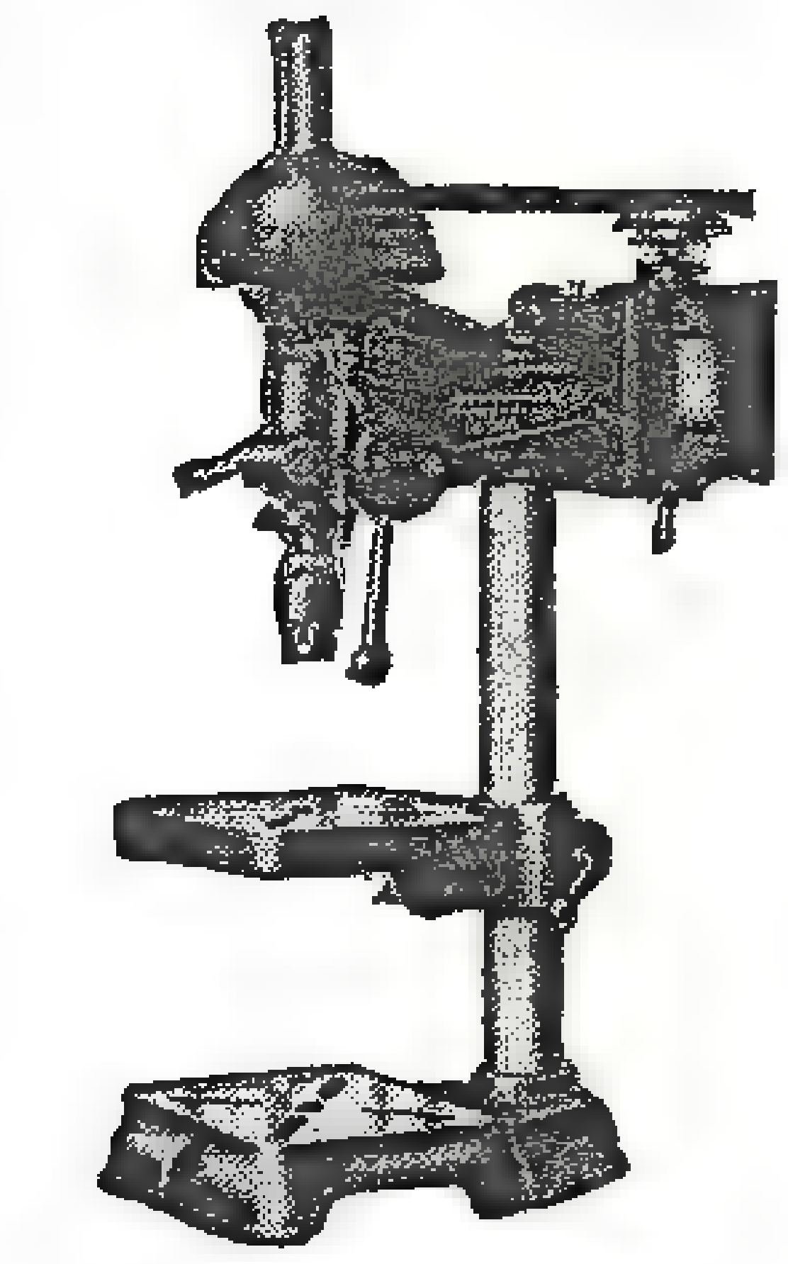

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[*Continued from page* 61]

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"Whereas our experiments were conducted between 30,000 and 36,000 feet, we do not plan to operate the new planes at this level but expect ultimately to carry passengers at 20,000 feet in these airplanes through the addition of cabin pressure equipment. The passenger cabins of these planes will be structurally designed and built for supercharging.

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"Rumbatron" To Smash Atom

A new type high-voltage atom smashing apparatus is now under construction by the Physics Department of Stanford University here which has tentatively been called the "Rhumbatron."

Choice of the name rumbatron has been made to distinguish it from the "cyclotron," first developed and used at the University of California by Prof. E. O. Lawrence.

The rumbatron consists of a cylinder 40 inches in diameter enclosed in a vacuum. Inside the cylinder are a filament and a grid which act like a giant radio tube. Electrical oscillations are set up in the apparatus somewhat similar to the squeals of a radio set except that they have a frequency much too high to be heard by the human ear.

When electrons are introduced into the cylinder they are accelerated by the oscillating field and, in present design will, attain energies equivalent to 5,000,000 electron volts for a single trip through the cylinder. If additional energy is needed for experiments on nuclear disintegration the electrons can be sent on two, three, or as many trips as necessary.

An important difference between the new rumbatron and the better-known cyclotron is that the former uses electrons as the bombarding particles while the cyclotron employs atomic nuclei themselves, which are much heavier.

Small models of the rumbatron have been successfully operated showing that the design is satisfactory for the large apparatus now being built.

Yawn Gives Rayon Strength

Just as a wide open yawn and a healthy stretch awakens dormant strength in the human body, so textile chemists have discovered that by making acetate rayon (one of the newer artificial silks) "yawn" and then giving it a long stretch, it doubles and triples its strength.

Not only that, but they can make the acetate rayon fabrics more resistant to hot water and soap liquors so that it retains its luster and strength on laundering. A. J. Hall, British textile chemist, made the discovery and has patented the method (No. 1,709,470).

Since then the acetate rayon textile industry has carried out much additional research work, and numerous patents have recently been taken out on all sorts of improvements on Hall's discovery.

Today rayon manufacturers are increasing by using stretch as a force by which their products can be improved. And because of it milady now wears stronger, more wearable and beautifully dyed rayon fabrics.

Say the textile finishers: If a cellulose acetate fabric has become delustered, "yawn it" and stretch it. Presto! The luster comes back. Is it weak? "Yawn it" and stretch it and you get new strength. Do you want to get novel dyeing effects in the fabric? "Yawn it" and stretch it. Interested in making crepe? Then take the yarn, twist, "yawn it," stretch it and finish twisting.

What is this "yawn it"? It's a sort of loosening up, a relaxation, of the internal forces of the fiber so that they become reduced and permit the yarn to be stretched, sometimes as much as 500 per cent the original length.

Yawning is accomplished by steeping the yarns and fabrics in chemicals like acetone, and acetic acid (familiar in the form of vinegar) which swell and make the yarns soft and plastic. In this state the yarns can be stretched way out like so much taffy. Pairs of rollers, some moving faster than others produce the stretch as the yarn speeds rapidly through the apparatus.

Once, the susceptibility of acetate yarns to stretching was regarded by rayon dyers and finishers as a big disadvantage. Today, they thank their lucky stars for it, because they have learned how to put it to work in producing new fabrics.

New Paint Remover Formula

A paint and varnish remover claimed to be superior to many preparations now on the market may be made from furfural and benzene, it is shown by research of the chemical engineering department at Iowa State College.

Furfural is a straw-colored oily liquid made from oat hulls. The formula is two parts furfural and one part a saturated solution of paraffin wax in benzine.

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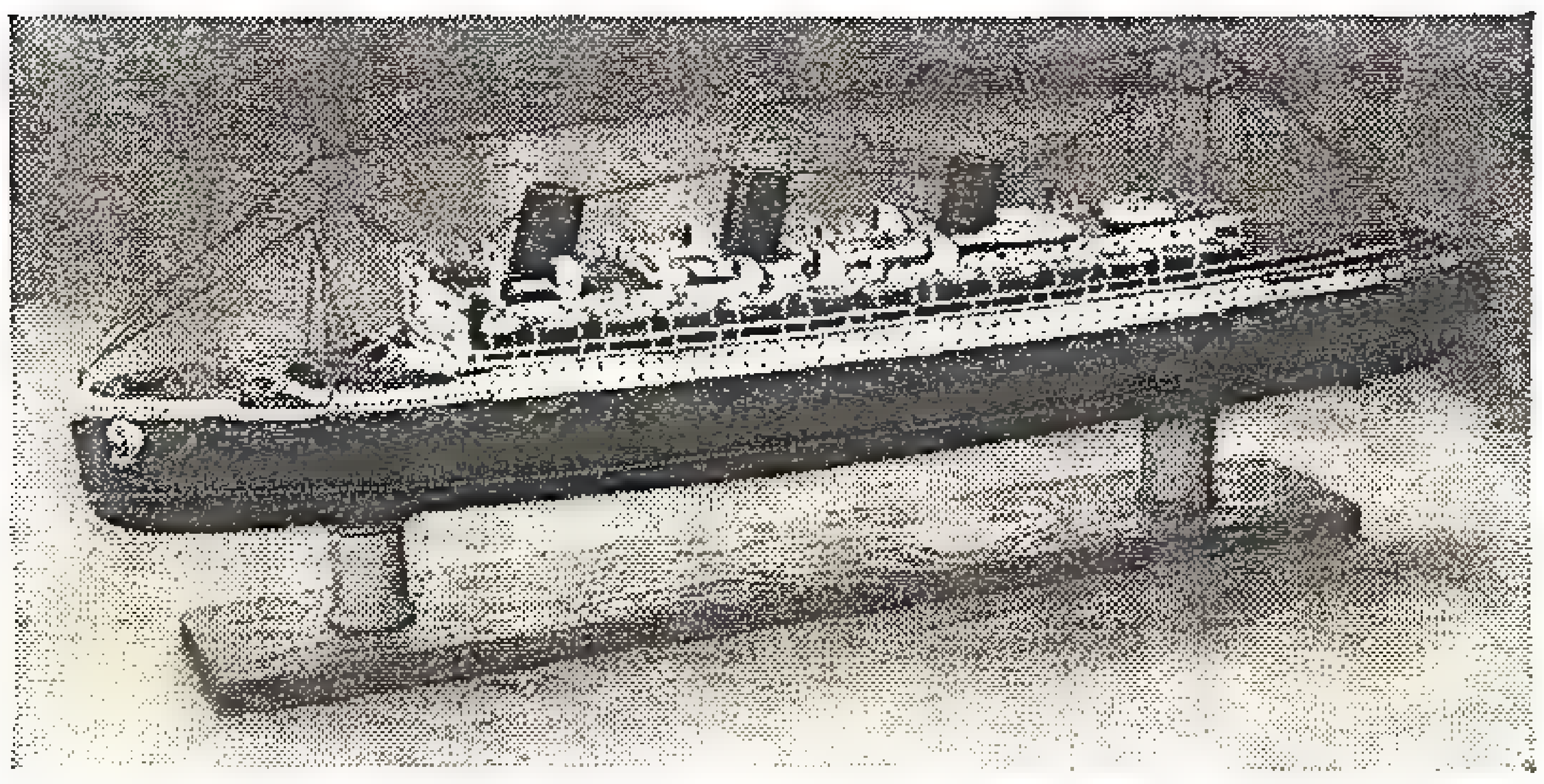
Editor's Workbench Chips

[*Continued from page* 28]



Modeling the *Queen Mary* has proved popular with craftsmen and MM plans helped Billy Glenn, of Gastonia, N. C., to turn out the excellent replica shown in this photo.

The editor is always glad to receive letters from MM readers, especially when they contain suggestions for future articles. Comments on past issues of MM are eagerly read by the editor and staff in an effort to more accurately gauge the interests of readers, so if you have any suggestions or criticisms, send them along.

***

Model airplane fans will be interested in a letter from Edwin Szczypinski, of Erie, Pa., who writes:

> Dear Editor:
>
> I would like to see more articles on the building of model airplanes, especially if you go into detail as you did with your last two models. I enjoy most the articles on aviation and I think the Editor's Workbench should be longer.
>
> Edwin Szczypinski.

Keep your eyes on future issues of MM, Edwin. We have several excellent model plane articles scheduled for early appearance.

***

From far away Scotland came a letter that outlines a good way of running a workshop club. Here is the letter:

> Dear Editor:
>
> A number of friends and myself are interested in your magazine. We have a workshop club and are 100% for the advancement of mechanics and inventions.
>
> The club makes a point of meeting three nights per week and on Saturday afternoons. I hope to be able to send you a photo of our members and workshop in the near future.
>
> Alex Rubin.

We will be looking for that photo, Alex, and believe many MM workshop fans will be interested in seeing it, too. Regular weekly meetings involving a discussion of many of the projects presented in MM is a sure fire way to hold a workshop club together. Try it, readers.

***

Send in you letters, project photos, and comment, readers.

"Ghosts" Trouble Atoms

Ghosts have often been suspected of being at the bottom of strange happenings on this earth. But the main claim of the modern scientist is that he has dispensed with such supernatural explanations for earthly events. In the world of modern science a ghost would indeed be a lonely individual!

Nevertheless, some of those fundamental entities of which the material world is believed to be composed behave in a very very strange way. Those "bundles of energy" called photons are perhaps the worst offenders. Even the physicist is somewhat at a loss when it comes to explaining the antics of a photon. And as far as the layman is concerned—well, perhaps a photon is as much like an old-fashioned ghost as it is like anything else!

Such seems to be—for purposes of popular explanation anyway—the view of Dr. W. F. G. Swann of the Bartol Research Foundation who, speaking informally at the Franklin Institute recently, said:

"A bullet is a kind of thing which can only be at one place at once and which strikes where it is. The electrons and protons (material particles) are like bullets. A ghost is a creepy kind of thing which can be everywhere always, which only strikes at one place at a time but which can strike anywhere." And this unpredictable, ghostly, kind of behavior, Dr. Swann went on to say, is characteristic of a photon.

Carrying the analogy still further, the speaker went on to describe how these photon-ghosts terrify the inhabitants of the atomic world. Particularly potent in this respect are the high-powered ones which accompany the cosmic rays. A picture on this page is one which Dr. Swann used to illustrate his talk. It shows what happens when an especially horrendous photon-ghost meets up with an unsuspecting atom.

Except for receiving a severe "mathematical fright" the atom comes through the ordeal without serious harm. But the ghost himself may be so dreadfully annoyed that he actually materializes—comes to life—in the form of particles of matter. New-born "particles with a punch" are formed which go tearing through the atmosphere ripping the outer structure off other atoms.

Jolts Barnacles Off Ship

Barnacles and other cumbering growths of plant and animal life can be prevented from forming on the hull of a ship by the passage of a weak current of electricity—less than 10 volts—is the claim of a Danish inventor, Richard Jensen. Mr. Jensen states that his method costs very little, and that it can be applied to piling and other submerged structures as well as to ships.

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PULVEX WORM CAPSULES

Science Finds Aid For Deaf

[*Continued from page* 55]

disclosed the fact that they all had some perception of sound, but so little that it was considered of no value. After several years, however, a teacher with an experimental turn of mind decided to find out whether those faint remnants of hearing could be reached and utilized. She secured a group hearing aid, learned to use it properly, and yet the youngsters wear the receivers every day, all day, as much as they liked. When they had special periods for speech lessons, she encouraged them to make the utmost use possible of the speech sounds they could get through the receivers. For some time they could not recognize a single word, but little by little they began to show that language through the ear was taking on meaning. They began to imitate the teacher's inflection, to speak with more smoothness, to demand that every new word be spoken to them through the phones, over and over.

Though born a deaf mute, Miss Frances Woods, pictured above became an accomplished dancer. She studied at special schools for the deaf in Youngstown and Columbus, Ohio. She "hears" with her toes, feeling the vibrations of the music which travel through the stage or dance floor. She is pictured in Chicago with Billy Bray, formerly her teacher and now her partner.

When I saw them, they were chattering like little magpies. It would have been hard for anyone to believe that they had entered school as deaf mutes. Their speech was not perfect—far from it—but it sounded more like the speech of hearing children than any speech I have heard from children with such profound deafness. If I had not seen their audiograms, I could hardly believe that they really heard so little.

Many children in schools for the deaf have more hearing than did this group. And the schools all over the country are waking up to the fact that the wonderfully improved new hearing aids, properly handled, offer a short cut toward normality that may revolutionize their work. More than half of all the children can be helped by them—some authorities even say more than two-thirds.

These hearing aids are the direct descendants of the telephone. Thus does Alexander Graham Bell, fifteen years after his death, contribute in still another way toward the normalizing of the group he championed!

People who see multiple group hearing aids in use for the first time sometimes look upon them as almost magical. Absurd stories have been published, proclaiming that children who had never heard a word in their lives were able, through these instruments, to hear and repeat everything spoken to them. A minute's thought will convince anyone that such stories could not be true. Who, if he had never heard the French language spoken in his life, could understand and repeat every word spoken to him, no matter how good his hearing?

The ordinary group hearing aid works in practically the same way as a radio. There is a microphone through which the speaker's voice is transmitted. There are amplifiers to increase the volume. There are receivers to deliver the sound to the listeners. These are individual headsets instead of loudspeakers, and each has its own volume control because the amount of hearing varies in different persons. There is nothing magical about it. If the listener has once had normal hearing and remembers how speech ought to sound, and if he still possesses enough hearing to appreciate the meaning when the speech sounds are sufficiently amplified, he will understand through an earphone at once. If he has forgotten the sounds of his native language (and it is amazing to what an extent they can be forgotten even by adults who think they remember perfectly), but can still hear them when amplified, he can re-train his hearing to be useful. If he has never heard speech well enough for the sounds to have meaning for him, he cannot learn to make use of very limited hearing, unless he is given the intelligent, patient, persistent training that was given the class I mentioned above. This is not always available in our schools, and many children with usable amounts of hearing are still being educated as if they had none. I believe, however, that this will not be true for many more years. The education of our educators in this matter is progressing very rapidly.

But what of those who have no hearing? Has science nothing new to offer them? Yes, there is something for them too. Let me tell about another class. Its teacher has had experience with pupils who were blind as well as deaf. Unable to teach them speech visually, she made

[*Continued on page* 156]

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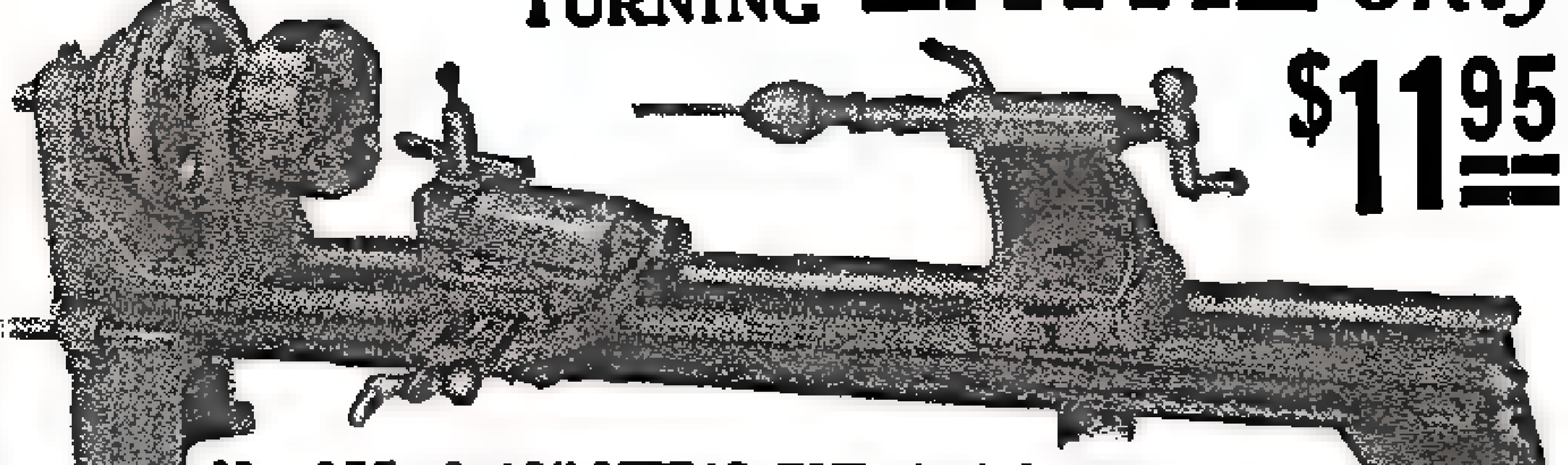

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Science Finds Aid For Deaf

[*Continued from page* 155]

use of vibration, with the astounding result that the pupils could understand her merely by placing their hands against her face. She resolved to try the same thing with deaf children who could see. I observed her class after she had been working with it four years. Any youngster in it could shut his eyes, place his hand on the teacher's face (or mine—I tried it), and understand any sentence within his vocabulary. And their voices were better, their speech clearer and smoother, and their general information more extensive than if they had been taught without the help of the vibration work. Some day it will be possible to amplify those speech vibrations and make it increasingly easy to use them. In fact, much work toward this end has already been done, but the cost is still too great and the effect too uncertain to make it generally practicable.

After all, though, there are not many children deaf enough to require education in special schools. They are only a handful compared to the hard of hearing—those with slight hearing losses, or deafness acquired after the establishment of speech.

A prominent educator of the deaf says that before the year 1900 the hard of hearing had not been invented! Although their number runs into millions, while the deaf are less than a hundred thousand all told, their problems were so much less acute that they simply were not recognized. Partial deafness, acquired by a person who has already achieved a normal command of speech and language, is likely to be regarded (by those who have not experienced it) as merely an annoyance. It is so much trouble to raise one's voice, or repeat several times, for a person who seems to misunderstand so stupidly!

Well, if that is the way you feel about it, think about this for a minute. Suppose that every word spoken to you were spoken through a closed window invisible to the speaker. If you turned your head to bring one ear closer to the glass that muffled the sound, your unnatural position would make you seem queer. If you asked for a repetition, the results might be no clearer. If you requested a second, or perhaps a third, you would see irritation plainly expressed in the face confronting you, and if you heard the voice clearly, its tone would be strained, and therefore harsh and unpleasant. Perhaps, after an effort or two, the speaker would look at you contemptuously (or pityingly, which is sometimes worse), and go away, or address his remark to someone else. Since most of the population would be on his side of the window, you would often see even, a person whom you knew to be stupid answering glibly a question to which you could give no reply.

Or suppose the voice through the window seemed to be telling you that this was B Street,

[*Continued on page* 158]

SPORTSMEN'S Manual

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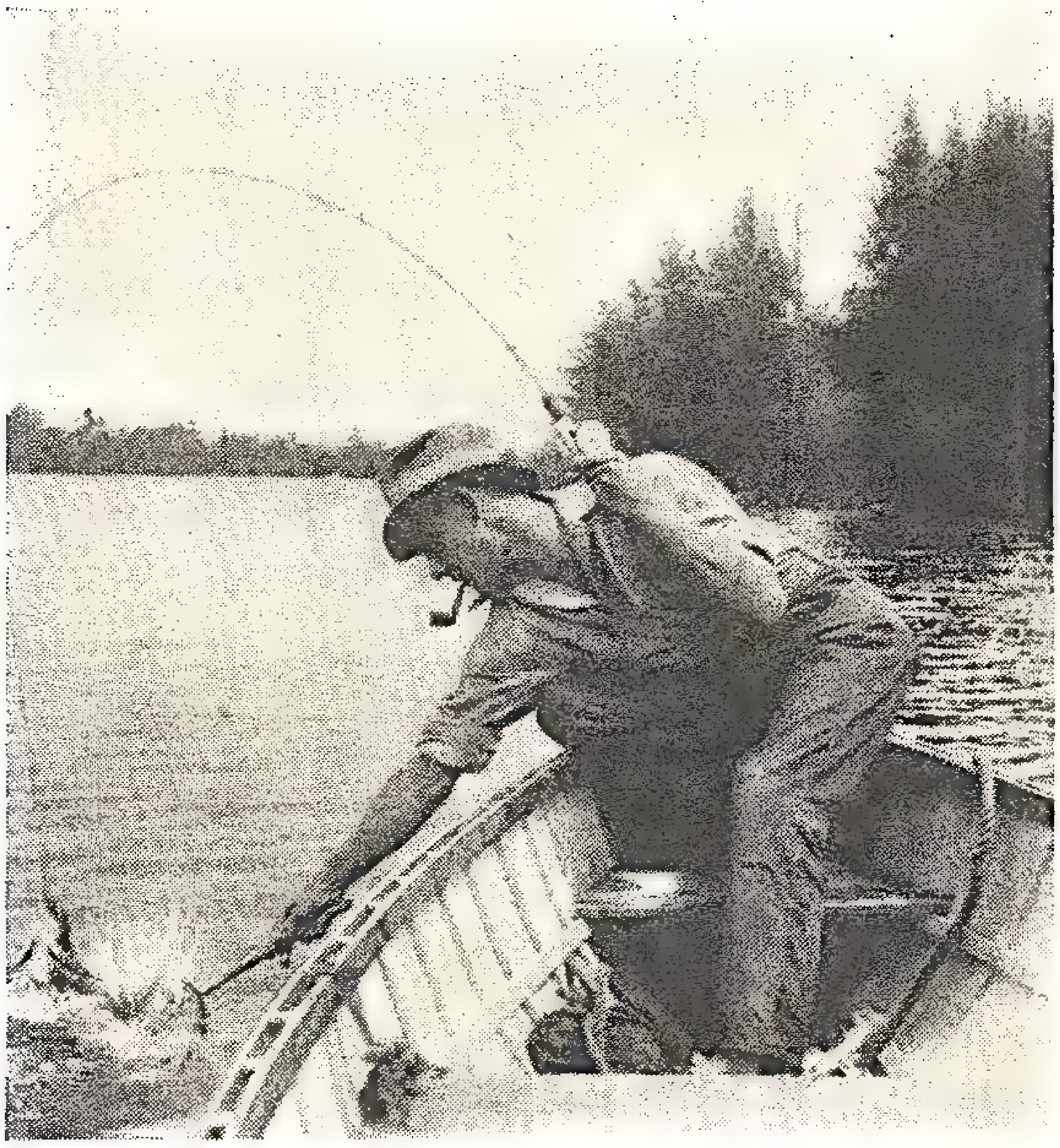
No sportsman should be without a copy of this all-new edition of the Sportsmen's Manual. Whether you hunt, fish, camp or indulge in other outdoor sports you will find in it numerous articles to meet your particular fancy. In addition to its many outdoor features the new 1937 edition contains complete plans for building two sportsmen's trailers, two boats and many kinks and short-cuts for the outdoor man.



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Science Finds Aid For Deaf

[*Continued from page* 156]

where you wanted to get off the car. And suppose you got off and found yourself at P Street, a mile from your appointment.

Or suppose the voice through the glass called a name, over and over, at a railway station, but you could not tell who was being paged, and so did not receive the message that would have kept you from taking a tiresome, unnecessary trip.

This is the day of amateur psychology. We prattle smoothly of inferiority complexes and repressions. How long, under such conditions as those, do you think it would take you to feel that you were an encumbrance of the earth and that the world was your enemy?

I am not telling a sob story. Things like that, and things far worse, have been happening for centuries to citizens whose hearing became defective. But even though their faces became strained or sad, their manner embarrassed or irritable, and their voices flat or discordant, nobody recognized their need for rehabilitation until they took matters into their own hands.

Hearing aids no larger than inkwells are now available for business offices. The executive behind the desk hears normally with the microphone-like device on the desk and a tiny receiver behind his ear.

Seeing the born deaf taught lip reading, they determined to learn it themselves. Learning it, they met scores of able, intelligent men and women with difficulties like their own. They pooled their common knowledge and experience and began, as one of their number put it, "knocking the *hard* out of *hard of hearing.*"

They established leagues for the hard of hearing in city after city. The one in New York, founded in 1910, is the oldest. There was no

[*Continued on page* 169]

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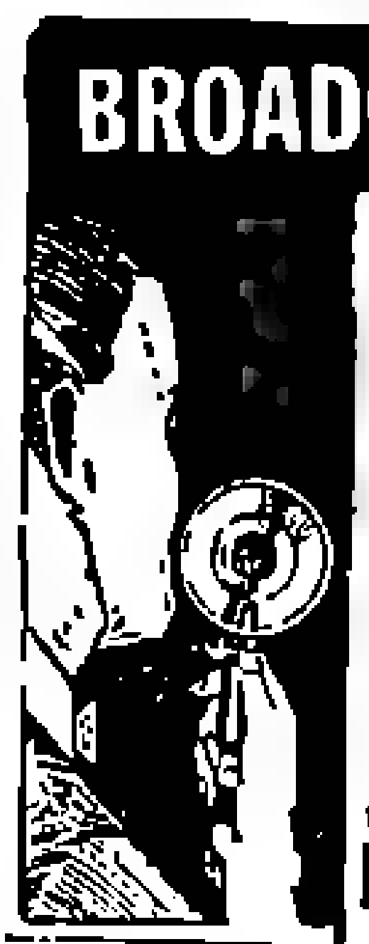
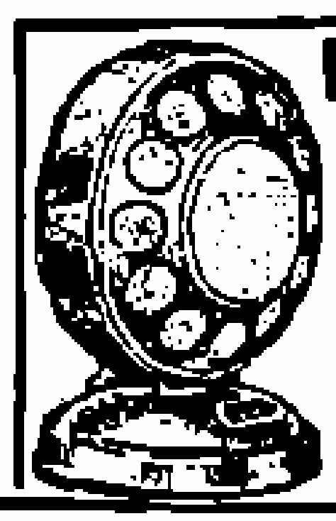


BROADCAST your voice on programs coming through your own radio set—make announcements from any part of the house—inject wise cracks, josh and mystify friends. Imitate radio stars, practice crooning, singing, radio acting, etc. Do a "Ben Bernie" or a "Rudy Valee."

World Mike

Made especially for home use, attached in a jiffy without tools. Not a toy. Put on your own programs at home, parties, club affairs, etc. Barrels of fun! Easy to operate.

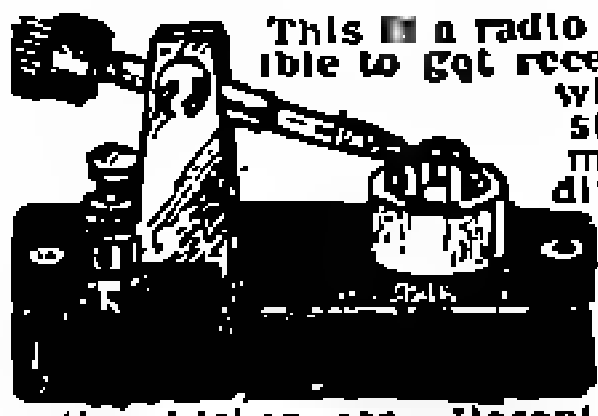
Price Postpaid 25c



DELUXE MIKE

Large, substantial, all-metal mike. Practise radio singing, broadcasting, programs, etc., thru your own radio. Reproduces voice in loud, clear tone without distortion. Regular table model—can be held in hand. Guaranteed. Connected without tools., Price **75c**

CRYSTAL RADIO 25c



This is a radio in itself as it is possible to get reception with it alone within 25 miles of a station (or up to 100 miles under good conditions). All you need is an aerial & ear phone. Completely assembled & wired with supersensitive crystal, stand, base, crystal cup, arm with cat's whisker, etc. Reception guaranteed. 25c

ALL WAVE WORLD WIDE RADIOS

Remarkable results—simple operation—low prices! 15 to 600 meters. Gets police calls, foreign stations anywhere, code, short wave, foreign and domestic broadcasts, etc. with remarkable volume and efficiency. Each set complete without tube, phone, battery or aerial. **ONE TUBE BATTERY SET.** Good headphone volume. Complete Kit **$1.65** Wired ready to operate $2.30. **SUPER ONE TUBE BATTERY SET.** Gives better volume & reception. Complete Kit $2.00 Wired, ready to operate $2.75. **ELECTRIC TWO TUBE.** Operates on house current. Uses no batteries. Powerful, sensitive, selective. Kit, $3.00. Wired, ready to operate. $3.75.

Radio & Television Book

How to build inexpensive crystal sets, electric radio, short wave radio, hints on building television set. With a television set you can SEE as well as HEAR reception. Tells how a simple home set may be built. Book of plans, etc. ONLY 10 CENTS.

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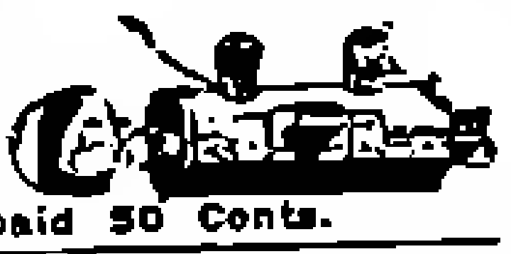

Eliminates aerial and filters electrical disturbances. Increases the reception from radio and makes greater distance and volume possible. Guaranteed. Price Postpaid 50 Cents.

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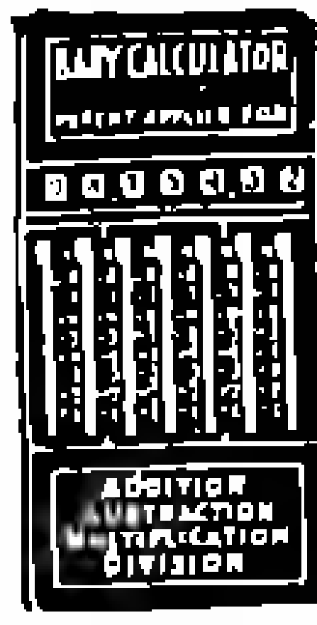

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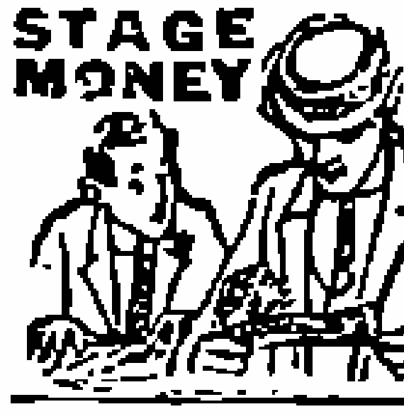

With a bunch of these bills, it is easy for a person of limited means to appear prosperous by flashing a roll of these bills at the proper time and peeling off a genuine bill or two from the outside of the roll. The effect created will be found to be all that can be desired. Prices: 40 bills 20c, 120 for 50c, or $3.50 per thousand postpaid

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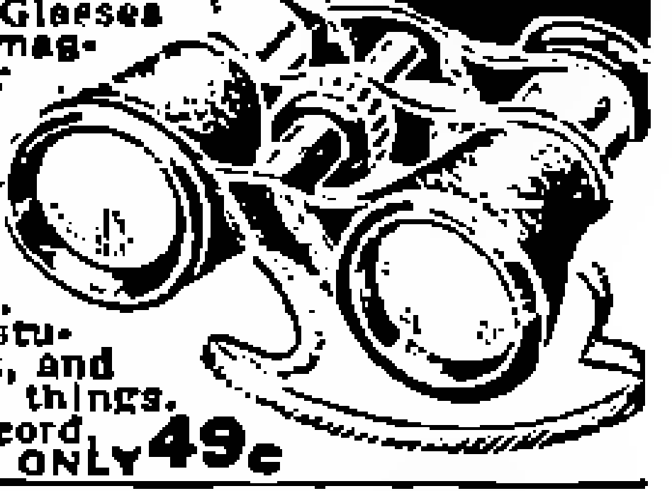

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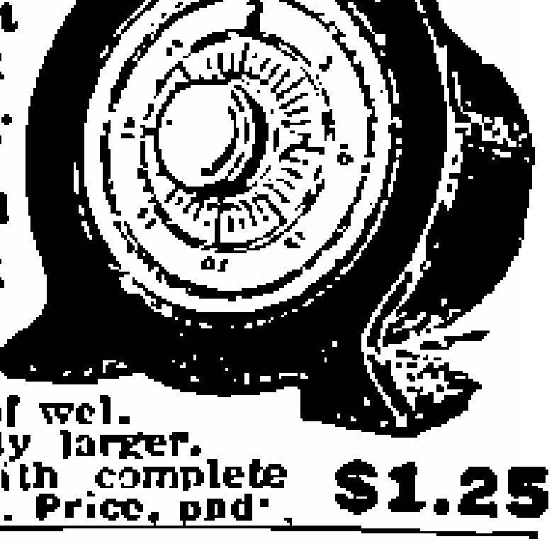

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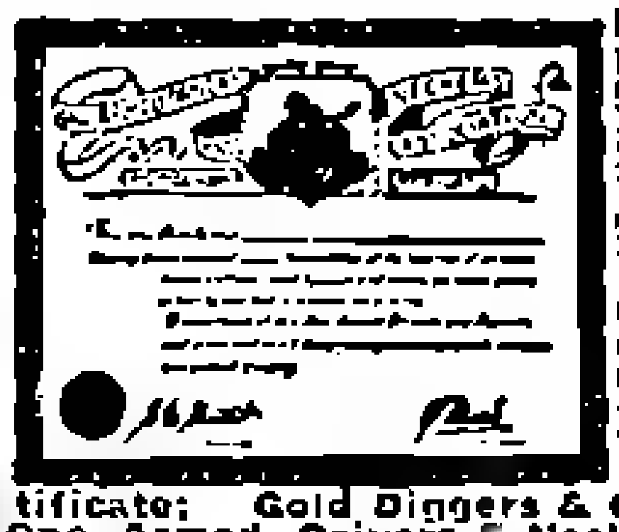

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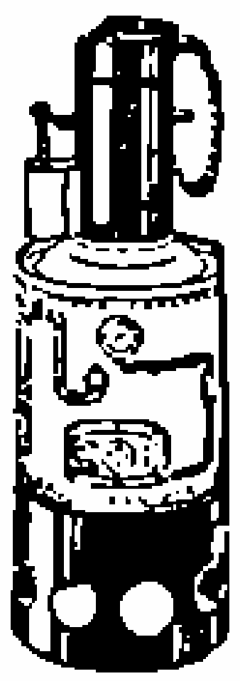

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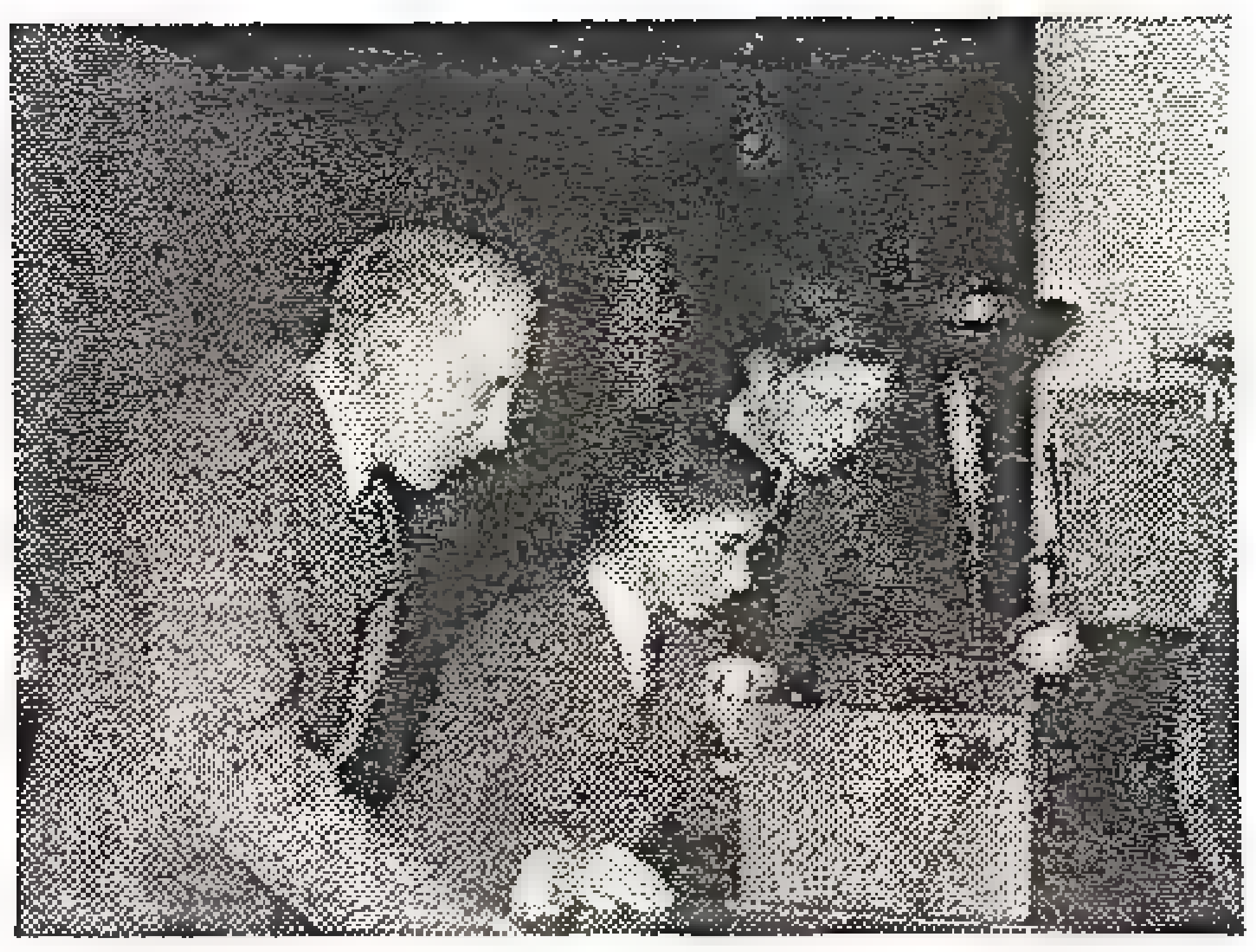

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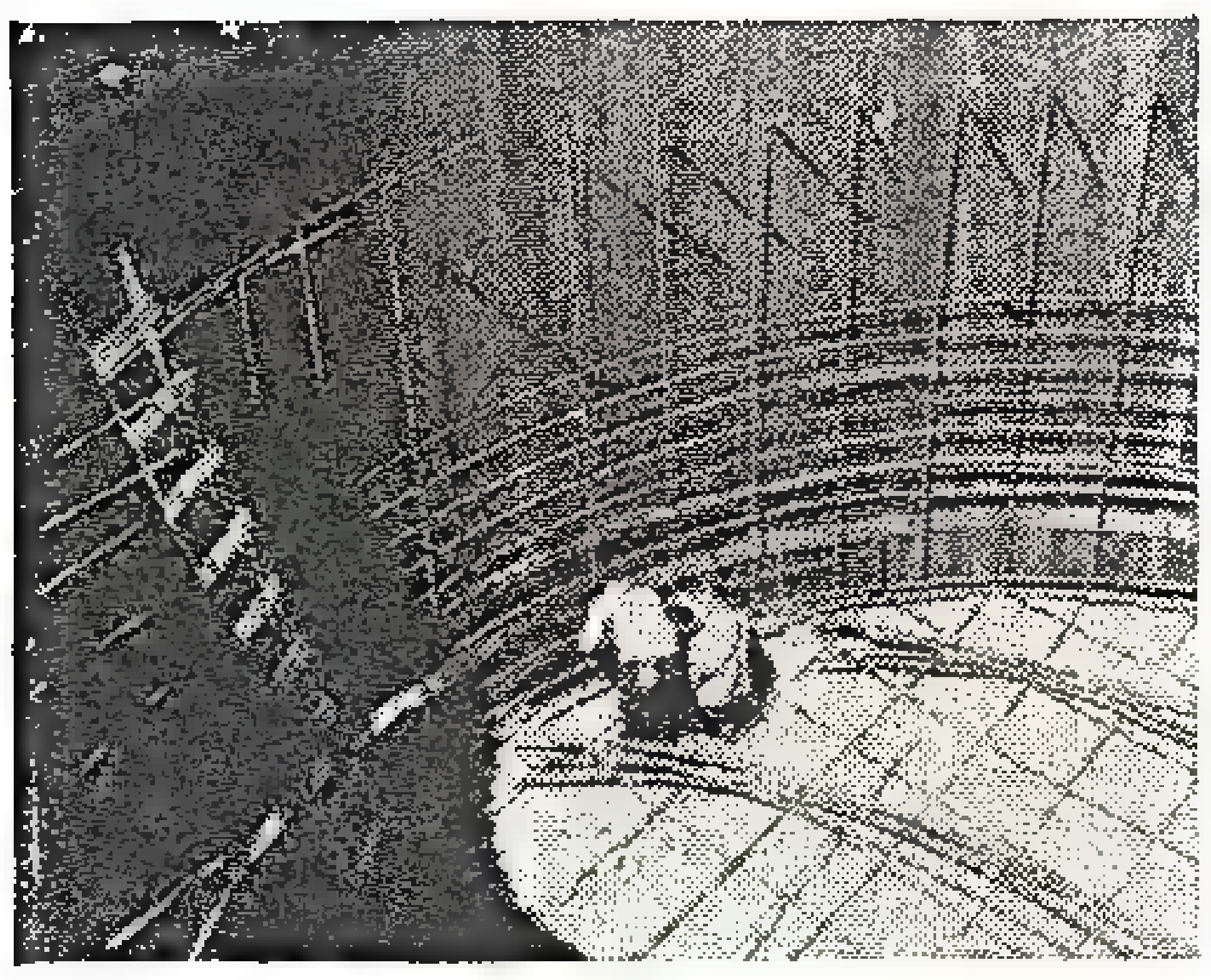

These workmen are placing reinforcing steel on one of the twenty 75,000 gallon capacity water tanks located in the hills near San Francisco. The tanks will insure adequate water in event of an earthquake or fire.

YOUR Ideas developed into practical working model. 30 years successful experience; thousands satisfied customers. Confidential service guaranteed. Bank references. Send 3c postage for 32 page book "Making Inventions Pay." Crescent Tool Company, Dept. T. Cincinnati, Ohio.

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RECONDITIONED Motorcycles. New—used parts for all makes. Authorized Harley-Davidson Dealer. Whitman Motorcycle & Supply Co., 405-9 Southwest Blvd., Kansas City, Mo.

SEND dime for sample Motor Racing Magazine, catalog new and used Indian, English Motorcycles, Auto-Glide Motor Scooters, racing helmets, goggles, parts, supplies all motorcycles. Clymer, 432 W. Pico, Los Angeles, Calif.

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TYPEWRITERS, multigraphs, addressing machines, adders, dictaphones, duplicators, sealers, folders. Save half, write Pruitt, 553 Pruitt Bldg., Chicago.

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CASH for old gold, teeth, watches, jewelry. 100% full cash value mailed day shipment received. Satisfaction guaranteed or articles cheerfully returned. Information free. Chicago Gold Smelting Company, 300-C Champlain Building, Chicago.

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$2000.00 for 1c. We Guarantee To Pay World's Highest Prices, certain 1909 cents $25.00, 1860 cents $500.00, Large cents $2000.00, Quarters $300.00, Gold Coins $7500.00, 1913 Liberty Head Nickel $350.00, certain 50c of 1838—$1500.00, 1853—$750.00, 1915—$13.50, 1921—$26.00, 1922—$60.00, 1928—$12.00, 1935—$60.00, Half Cents, Half Dimes, Foreign Coins, Paper Money, and thousands of others up to $5000.00 each. Know What Your Coins Are Worth. Send Dime for 1937 World's Largest 10c Complete Illustrated Catalogue. Romanocoinshop, Dept. 159, Nantasket, Mass.

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INVENTORS. Do you feel you have a valuable invention? A novel invention may produce something salable if patented. Are you groping in the dark—getting nowhere? Learn how other men with inventions attained success. Write for our FREE Book, "Patent Guide for the Inventor" which tells you of fields where inventions bring profits if they are good patented ones. Clarence A. O'Brien & Hyman Berman, Registered Patent Attorneys, 28-D Adams Building, Washington, D. C.

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DEVELOP Personality, sex appeal, charm, magnetism. Attain power, success. Overcome bashfulness, fear, timidity. Send for free booklet "Power of Personality." School of Personal Development, D-1, Woolworth Building, Dearborn, Michigan.

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LARJARGRAPH Reprints: Five (5x7 enlargements) 25c. Cardinal Photo, Summit, N. J.

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PRINT your own cards, stationery, circulars, advertising, etc. Save money. Easy rules furnished. Print for others, big profits. Junior press, $5.90; job presses, $11; power, $149. Write for details. Kelsey Co., S-57, Meriden, Conn.

Mechanical "Newsie" Vends Daily Papers

These mechanical newsboys have recently made their appearance throughout England. A coin deposited in the slot delivers either a newspaper or favorite magazine. The machine shown at left is designed especially for vending bound volumes.

FREE Card Case! 1,000 Business Cards $1.75. Letter-heads, Envelopes, Statements. Tucker's Press, MM, Box 63, Indianapolis, Ind.

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PROPELLERS Sled-Lightplane, literature 10c. Woodcraft Propeller Co., Hillside Station, Wichita, Kans.

24" AIRPLANE fan propellers, $2.00 postpaid. Fanco, 7716 South Broadway, St. Louis, Mo.

RADIO & TELEGRAPHY

RADIO BUILDERS' MANUAL—A book of radio set building plans and kinks for the home experimenter. Everything from a crystal set to a powerful 6-tube auto radio is included. Price 50 cents—order directly from Modern Mechanix Publishing Co., Fawcett Bldg., Greenwich, Conn.

RADIO Engineering, broadcasting, aviation and police radio, Servicing, Marine and Morse Telegraphy taught thoroughly. All expenses low. Catalog free. Dodge's Institute, King St., Valparaiso, Ind.

CRYSTAL Set—4250 mile record. Blueprint 18 Distance Models with "Radiobuilder" year—25c. Laboratories, 151-K Liberty, San Francisco.

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WANTED—Men for good paying work with a large shoe company. Good pay every day. Free shoes as bonuses to "go-getters". No experience needed. Complete sales outfit sent free. Write Consolidated Shoe System, Dept. G27, Chippewa Falls, Wis.

DON'T Be a Job Hunter—Start your own business on our capital. No hard times; no lay-offs; always your own boss. Hundreds average $3,000 to $5,000 annual sales year after year. We supply stocks, equipment on credit. 200 home necessities. Selling experience unnecessary. Wonderful opportunity to own pleasant, dignified, profitable business backed by world wide industry. Write Rawleigh, Dept. E-U-MOM, Freeport, Ill.

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MICROMETER, ½-inch 50c. Premier Products, 449 Gladstone, So. Bend, Indiana.

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VENTRILOQUISTS

LEARN Ventriloquism by mail; small cost, 3c stamp brings particulars. Geo. W. Smith, 125 North Jefferson, Room S-665, Peoria, Ill.

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"THE WELDING ENCYCLOPEDIA" is a welding book worth its weight in gold, for the beginner or old timer or anybody who has anything to do with welding. Illustrated, instructive; describes theory and practice of every welding process. Sent postpaid $5.00. Welders' Club of America, Box 3432-B, Merchandise Mart, Chicago.

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GENERATOR Propellers, expertly designed at factory prices. Universal Aircraft Co., Fort Worth, Texas.

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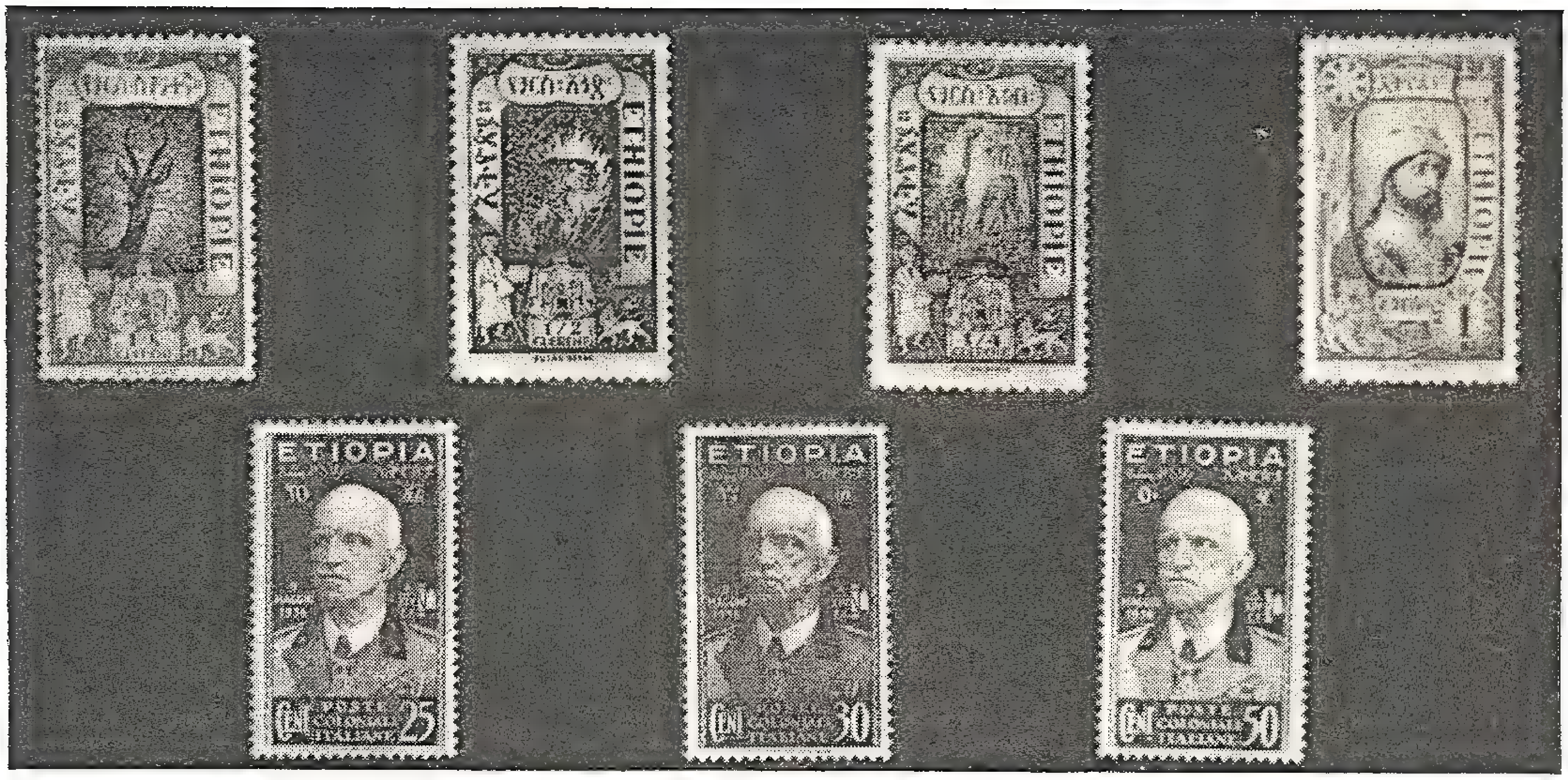
"MODERN Wood Sculpture." Complete instruction book on carving statues $1.00. Lee, Wood Art Studio, Dept. 3, Centerville, Ia.

ITALY ISSUES NEW ETHIOPIAN STAMPS



The Italian government recently replaced the postage stamps of Ethiopia with special issues bearing the likeness of King Victor Emanuel. The new stamps are identical in shape to the original issues although not as picturesque. The upper stamps show some of the many attractive wild life scenes which appeared on the stamps issued by the Haile Sellassie government.

TO STRENGTHEN their claim on Ethiopia, their recently acquired colony, the Italian Government has issued a series of postage stamps to replace those of the former government of Haile Sellassie. The new stamps show a likeness of Italy's King, Victor Emanuel, and are identical in size to the original Ethiopian issues. While not as picturesque as the colorful Sellassie stamps, the new issues make a valuable addition to any collector's album.

The stamps are obtainable from practically all stamp dealers.

ADLETS FOR HOBBYISTS

(See regular classified section for rates and other information.)

STAMPS

SUPER-WONDER Packet offered, containing 60 different stamps from Afghanistan, Transjordania, North Borneo, Manchukuo, Sudan, Macao, Iraq, Charkhari, French and British Colonies, including natives, beasts, ships, etc., all for 5c to approval applicants. Big illustrated lists included. Kent Stamp Company, Box 872 (G. P. O.), Brooklyn, N. Y.

EXTRAORDINARY Free Offer—Turks Caicos, $5 U. S., Caymans, Western Samoa (native girl), genuine Baden. Everything free to approval applicants enclosing 3c postage. Viking Stamp Company, 1-MM Hanson Place, Brooklyn, N. Y.

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MAGNIFICENT Mourning Stamp; complete issue commemorating bloodiest period in history with 20 additional commemoratives only 10c. Friendly Filatelists, 3615 N. Sydenham, Philadelphia, Penna.

LARGE Spanish ship stamp, Azerbeijan Cameroons, Chad, Dahomey, Gabon, Ubang in packet of 57 stamps. All for 5 cts. with approvals. Swedell, 3129 Garfield Ave., Minneapolis, Minn.

STAMPS! 100 diff. 3c; 500 diff. 35c; 1,000 diff. 90c! Illustrated Album (4000 spaces) 22c. Approvals sent. Tatham Stamp Co. (D9) Springfield, Mass.

MONTHLY Stamp Magazine, 6 months and 25 foreign stamps, 25c. American Stamp Journal, Cedar Rapids, Iowa.

FREE!!! King George Memorial Packet, 15 varieties. Postage 3c. Roberts, 901-T Fourth, Baycity, Michigan.

FREE—25 different North-American to approval applicants, enclosing postage. Sidenburg, Baroda, Mich.

AIRMAILS, Mint and Used, Request Price List. Carlos Kroger, Box 140, Guatemala City, C. A.

STAMP WALLET, with stamps, approvals, 10c. Andy Anderson, 3521 Ogden Ave., Chicago.

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CALIFORNIA GOLD, quarter size; 27c, $½ size; 53c. Illustrated Catalogue Coins and Stamps 25c. Norman Shultz, Salt Lake, Utah.

FREE: Foreign Coin, Banknote and Large Illustrated coin catalogue, for 4c postage. Approvals sent. Tatham Coinco, Springfield-9, Mass.

COINS, Beadwork, Indian Relics, Minerals, Books, Curios, Stamps. Catalogue, 5c. Indian Museum, Northbranch, Kansas.

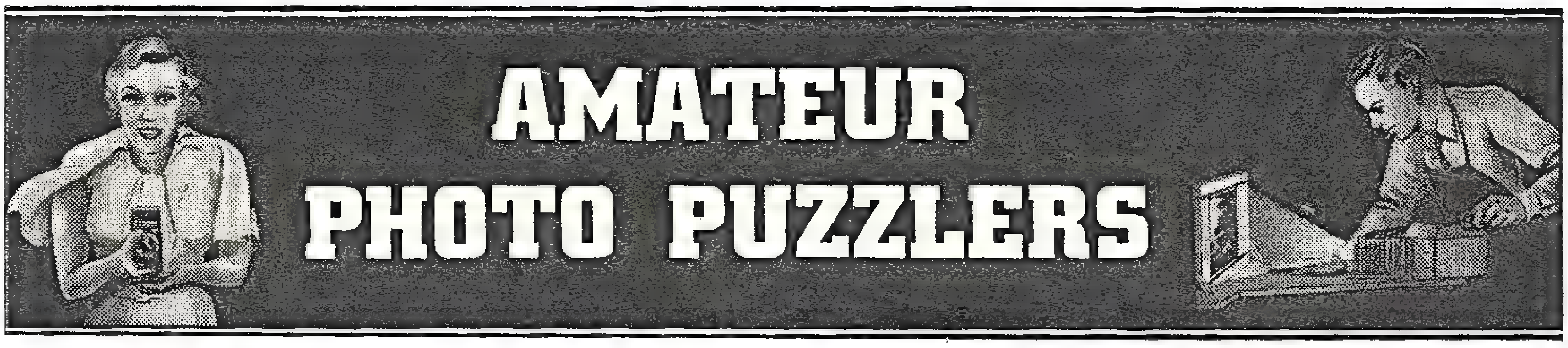
INDIAN CURIOS

13 ARROWHEADS, Spearhead, Lancehead Wampum 99c. Gempoints, Bannerstones, Pipes. 125,000 Bargains. Firearms—Photolist 10c. Museum, Rutland, Illinois.

INDIAN CURIOS. 100 good ancient Arrowheads $3.00. Tomahawk Head 50c. Illustrated catalog 5c. H. Daniel, Dardanelle, Arkansas.

ANTIQUE FIREARMS

BLUNDERBUSSES, Matchlocks, Duelling Pistols, Pepperboxes, Flintlocks, Kentuckys, Indian Guns, Swords. Photolist 10c. Museum, Rutland, Illinois.



AMATEUR PHOTO PUZZLERS

In this department the Photography Editor will answer any question or problem related to cameras of all types, enlarging, printing, developing, taking pictures, and the various phases of home movie making. When sending questions to this department, be sure to include a stamped, addressed envelope in case space does not permit publication of the question and reply on this page. Send all inquiries to the Photography Editor, Modern Mechanix, *1501 Broadway, New York City.*

TAKING SNAPSHOT PICTURES IN COLORS

Having read, with interest, various advertisements on the making of home movies in color I am wondering if it is possible to make colored snapshots with a regular camera. Can you offer any constructive advice on the subject?—Carl Thompson, Des Moines, Iowa.

Snapshots in color, for projection on a screen are possible, although the making of natural color prints is a rather involved process and should be attempted only by the experienced photographer. Your photographic dealer can supply you with filters and film required for making colored films for projection and all descriptive literature needed. A new color print process known as Ruthenburg Color Photography permits actual color prints to be taken with an ordinary camera. An interesting article on color photography appeared in the October, 1936 issue of Modern Mechanix.

NEGATIVES SHOW GREASY DEPOSIT

On negatives recently developed I found a greasy deposit present on the surface of the film. Can you suggest the cause for this and how I can prevent future films from reacting in this manner?—Danial T. Johns, Toronto, Ontario, Canada.

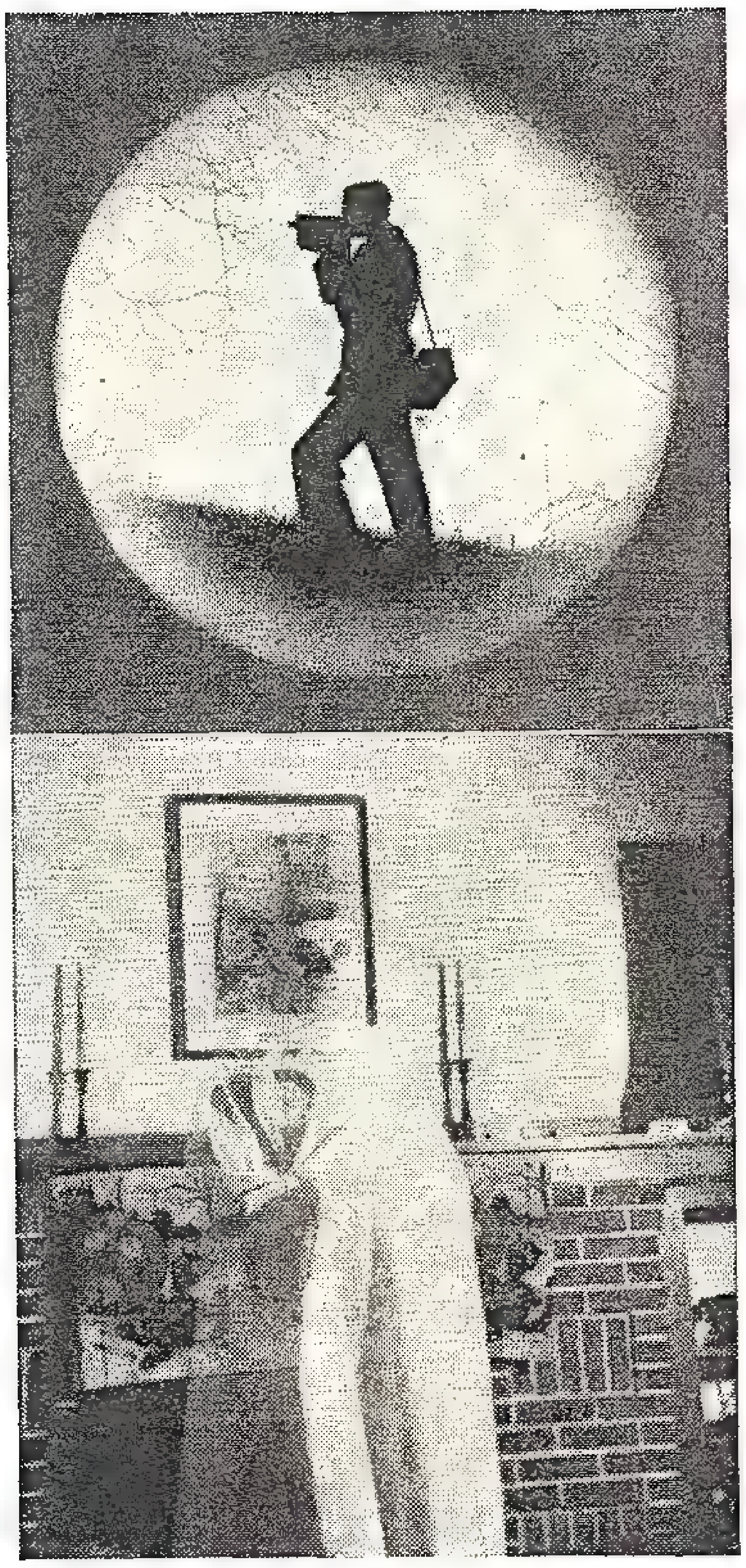
The greasy deposit which you mention was no doubt caused by an insufficient quantity of acid in the fixing bath. The deposit, itself, is probably aluminum sulphite. If you do not rinse the films sufficiently before placing them in the fixing bath, the developer may gradually neutralize the acid of the bath resulting in the greasy aluminum sulphite formation.

TINTING PICTURES IN COLOR

For the beginner, which type of photographic coloring is advised, water or oil colors? I have heard a professional photographer remark that when water colors are applied they cannot be removed while oil colors can be rubbed off the surface of the picture if the wrong hue is obtained. Can you offer any advice on this subject? — Richard Owens, Miami, Florida.

If regular photographic colors are used to tint pictures the oil type is preferred to the water colors since they can be wiped off if a mistake is made in the tinting. Recently a new transparent dye for photographs was introduced to the artists profession which has unlimited possibilities since it not only produces unusual natural color effects, but can be removed with a special eradicator if results are not satisfactory. Instructions for applying colors to photographs will be found in the book, "How To Make Good Pictures". Copies are available from the Photography Editor at 50c.

PHOTO ODDITIES



The unusual silhouette scene shown above won for Edward T. De Voe of Berwick, Pa., this month's $5 photo award. The picture was taken by pointing the camera toward the setting sun and using a very short exposure. The weird ghost picture is a double exposure and was taken by Mrs. Martha Davis, Hamburg, N. Y. She receives Modern Mechanix' $3 monthly photo award.

HOW TO CLEAN A CAMERA LENS

What is the proper method for cleaning the lens of a camera? My camera lens, being exposed, naturally picks off a considerable amount of dust and in cleaning it I would like to use the best method possible so as not to scratch the lens surface. —Charles Jackson, Davenport, Iowa.

The lens of all cameras should be cleaned from time to time so that pictures are free from haze or dullness. The simplest way to free the lens from dust and dirt is to breathe on the glass then wipe it off thoroughly with a soft lintless cloth or cleansing tissue. If the lens is dusty it should be first freed of the dust by brushing over the surface with a soft camel's hair brush. Optical or eye glass cleaning fluid can be used to remove grease. Clean both sides of the lens by removing it from the camera.

PREVENTING PRINTS FROM CURLING EXCESSIVELY

Being a newcomer in amateur photography I have been experiencing considerable trouble in drying my prints flat. After removing the prints from the washing tank and setting them aside to dry, I find upon my return that they are curled up to such an extent that to open them would result in their cracking. How can I overcome this?—John T. Williamson, Chicago, Ill.

To prevent the curling of glossy prints they should be dried face down on a polished chrome metal plate or special enameled ferrotype tin. All photographic supply houses stock these plates.

Prints having a dull finish can be dried face down on photo lintless blotters or on cheesecloth stretchers. After the prints have dried, moisten their backs and place them between cardboards under several pounds pressure until dry a second time.

To prevent excess curling your prints can be placed in a solution composed of one part glycerin to ten parts of water after removing them from the final washing tank.

The photography editor will pay $5.00 or $3.00 each for photographs interesting enough for publication on this page. All pictures should be mailed to Modern Mechanix Publishing Co., Greenwich, Conn.

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NUFOND GIANTS WEIGH UP TO 3 LBS. EACH

EASY TO START!

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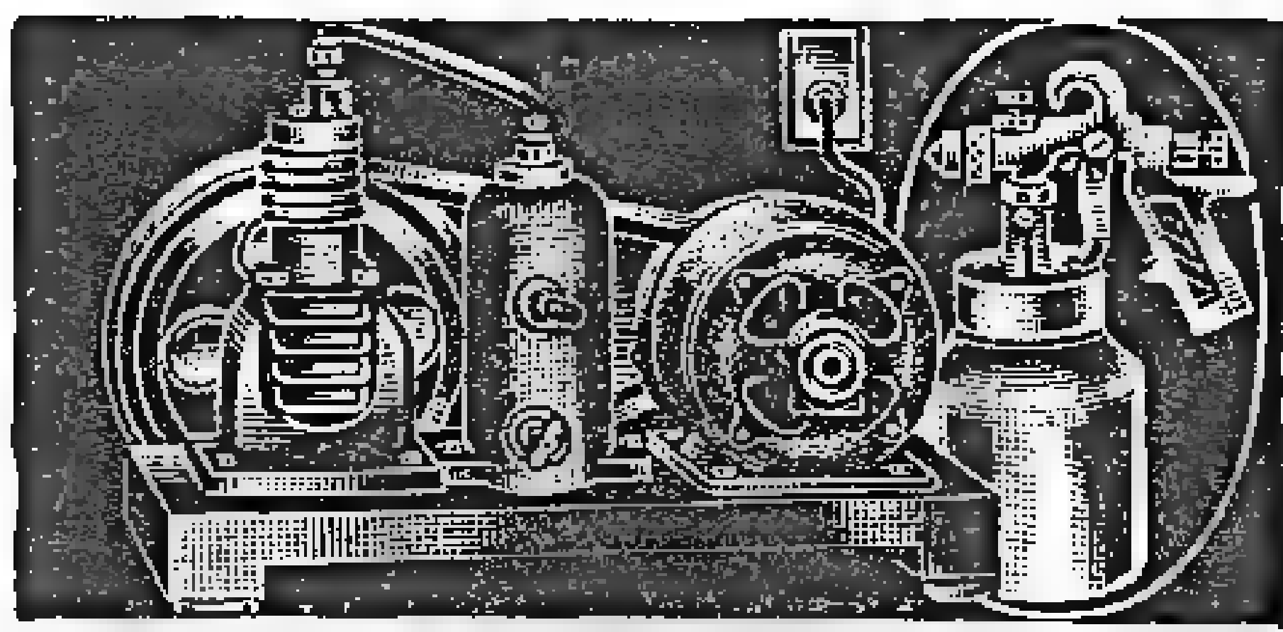

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Ideal for all around Spraying work. Sprays Lead Paint, Lacquers, Enamels, Varnishes, Cold Water Paint, Dyes, Insecticides, Disinfectants. Suitable for Homes, Schools, Clubs, Hospitals, Stores, Factories, Office Buildings, and Work Shops. Furnished complete with Internal Mix Pressure Feed Gun, Quart Aluminum Cup, 2 Nozzles (Fan and Round), adjustable Air Control; Compressor Piston Type, size 1½x1½; Air Cooling Pulley, V-Belt Drive; Filter; ⅛ H.P., 110 volt, 60 cycle, AC Motor; 8 ft. Cord and Plug; mounted on Base; 15 ft. Oil Resisting Air Hose. The National Utility is a low priced Power Sprayer; the kind of machine that usually sells for $35.00 to $40.00. **OUR SPECIAL PRICE $22.50** Complete, plus postage. Shipping weight 50 lbs. Sold with money back guarantee. Cut out this ad. Print name and address in margin below. Send $5.00 deposit, bal. C.O.D.

NATIONAL ELECTRIC TOOL COMPANY, Dept. MD, 560 Washington, CHICAGO, ILL.

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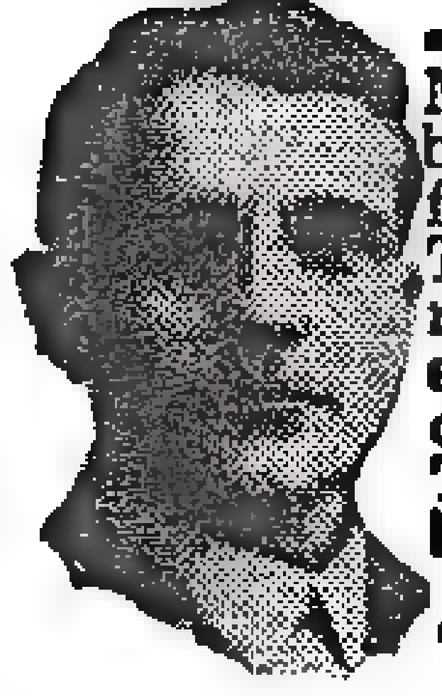
–Every deaf person knows that–



Mr. Way made himself hear his watch tick after being deaf for twenty-five years, with his Artificial Ear Drums. He wore them day and night. They stopped his head noises. They are invisible and comfortable, no wires or batteries. Write for TRUE STORY. Also booklet on Deafness.

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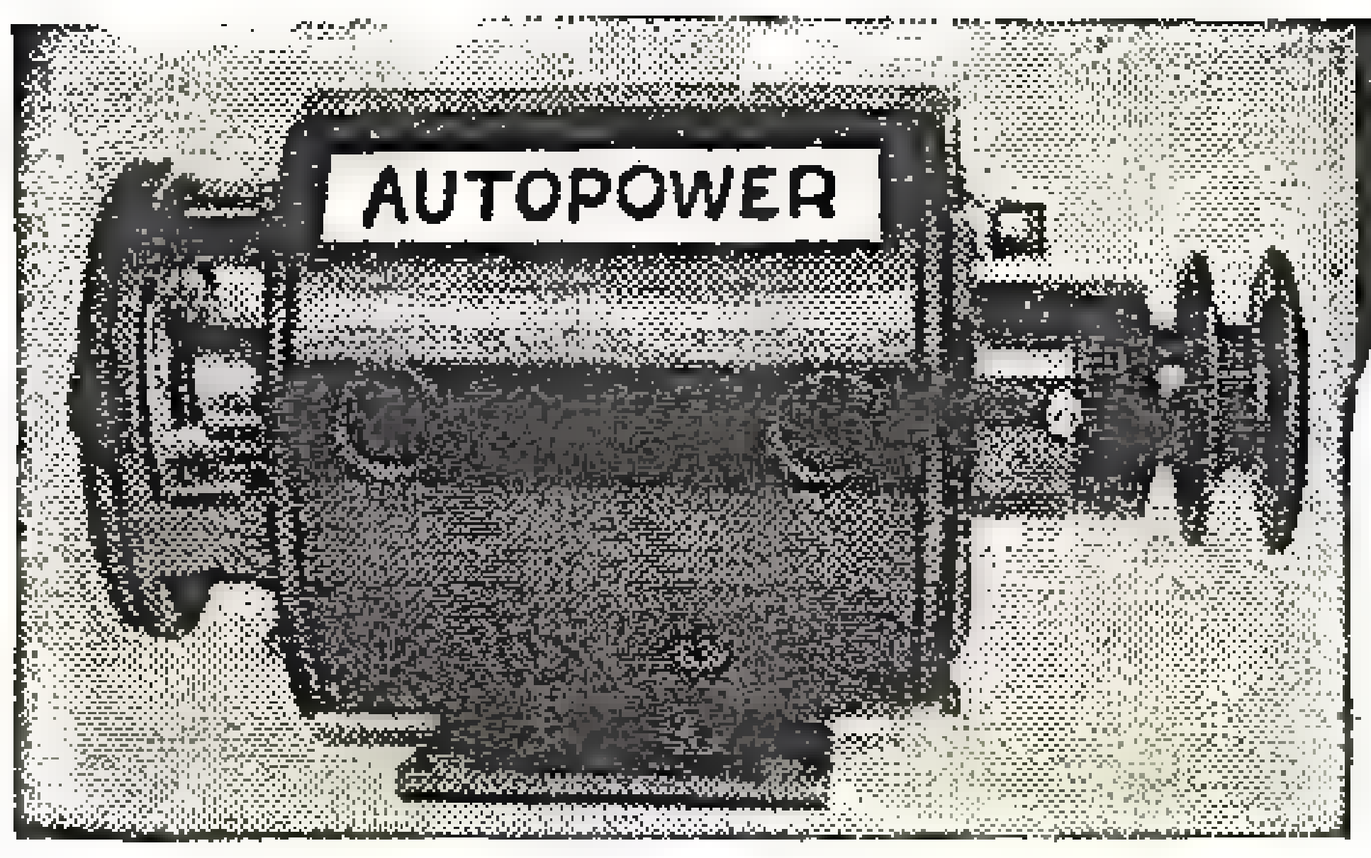

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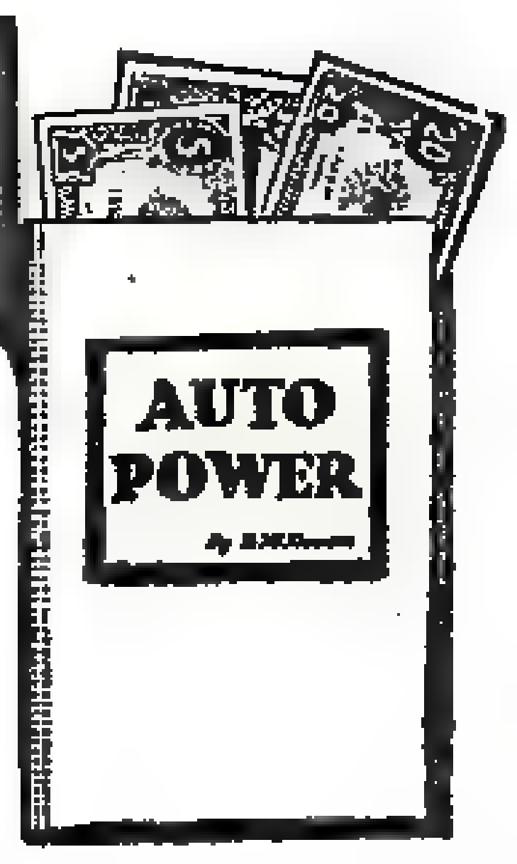

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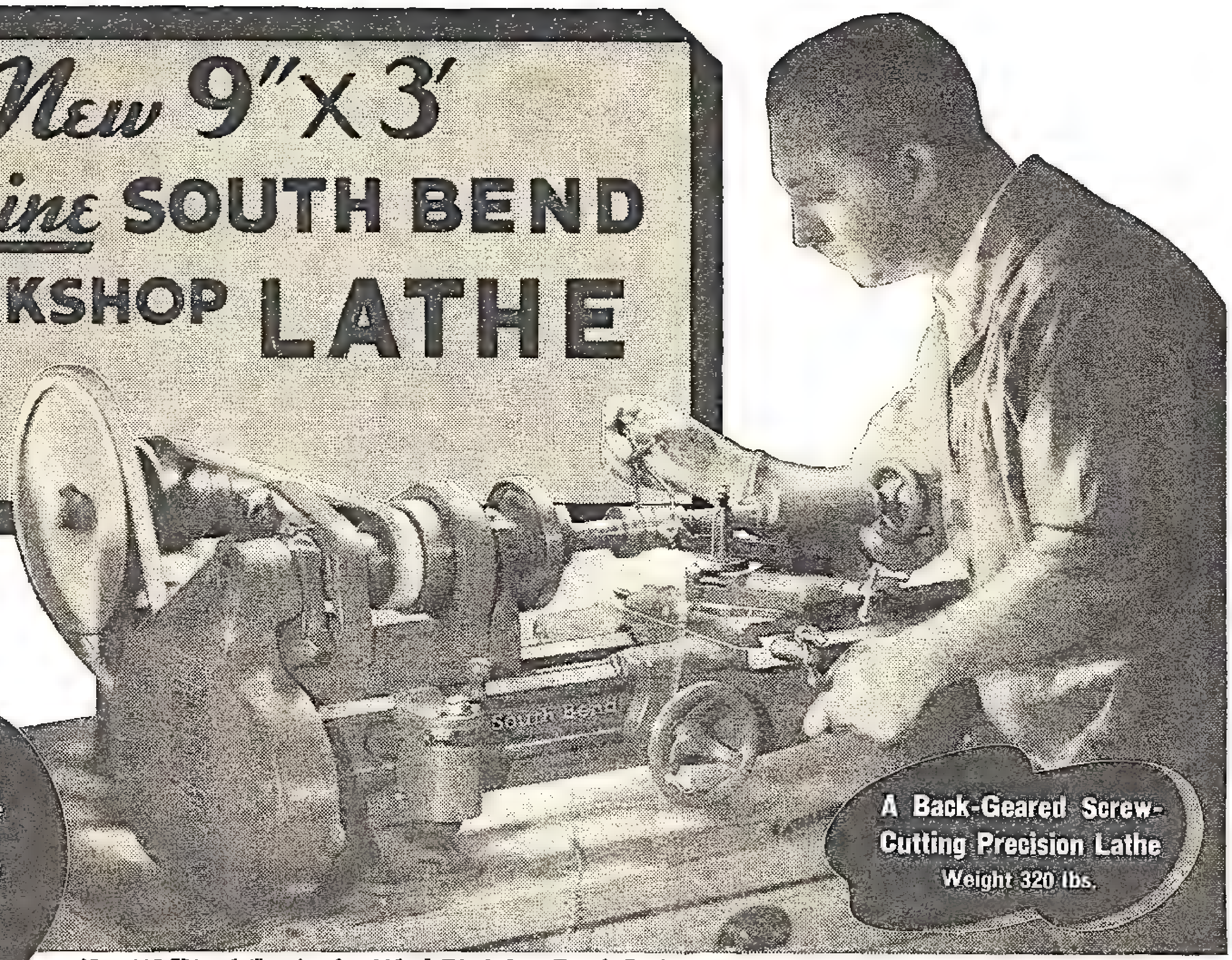

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No. 415-YA 9¼" swing by 3' bed Workshop Bench Lathe with Horizontal Motor Drive, ¼ h.p. Reversing Motor, Switch and belt tension countershaft as shown above.......... **$116.00**
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THE new 1937 model 9-inch Workshop Precision Lathe is a back-geared Screw Cutting Lathe and is recommended for the finest, most accurate jobs in manufacturing—in the tool room, in home workshops and automotive machine shops. Workmanship and materials used are exactly the same as used in more expensive models of larger size, making it represent the greatest value we have ever offered in 31 years of fine lathe building.

Features include Twin Gear Reverse to lead screw, Ball Thrust Bearing on Spindle, Longitudinal Screw Feed to Carriage, Precision Lead Screw for Cutting screw threads—and scores of other important features. Takes 38 practical attachments for milling, grinding, draw-in collet chuck work, and many other manufacturing jobs.

South Bend Lathe Works
518 E. Madison St., South Bend, Ind., U.S.A.

5 OTHER SIZES: 9", 11", 13", 15" and 16" SWING IN ALL BED LENGTHS PRICED $97 to $1200

Lathe shown below is No. 117-C 16" x 6' Quick Change Gear Underneath Belt Motor Driven Lathe with 1 h.p. motor. Complete as shown. **$869**
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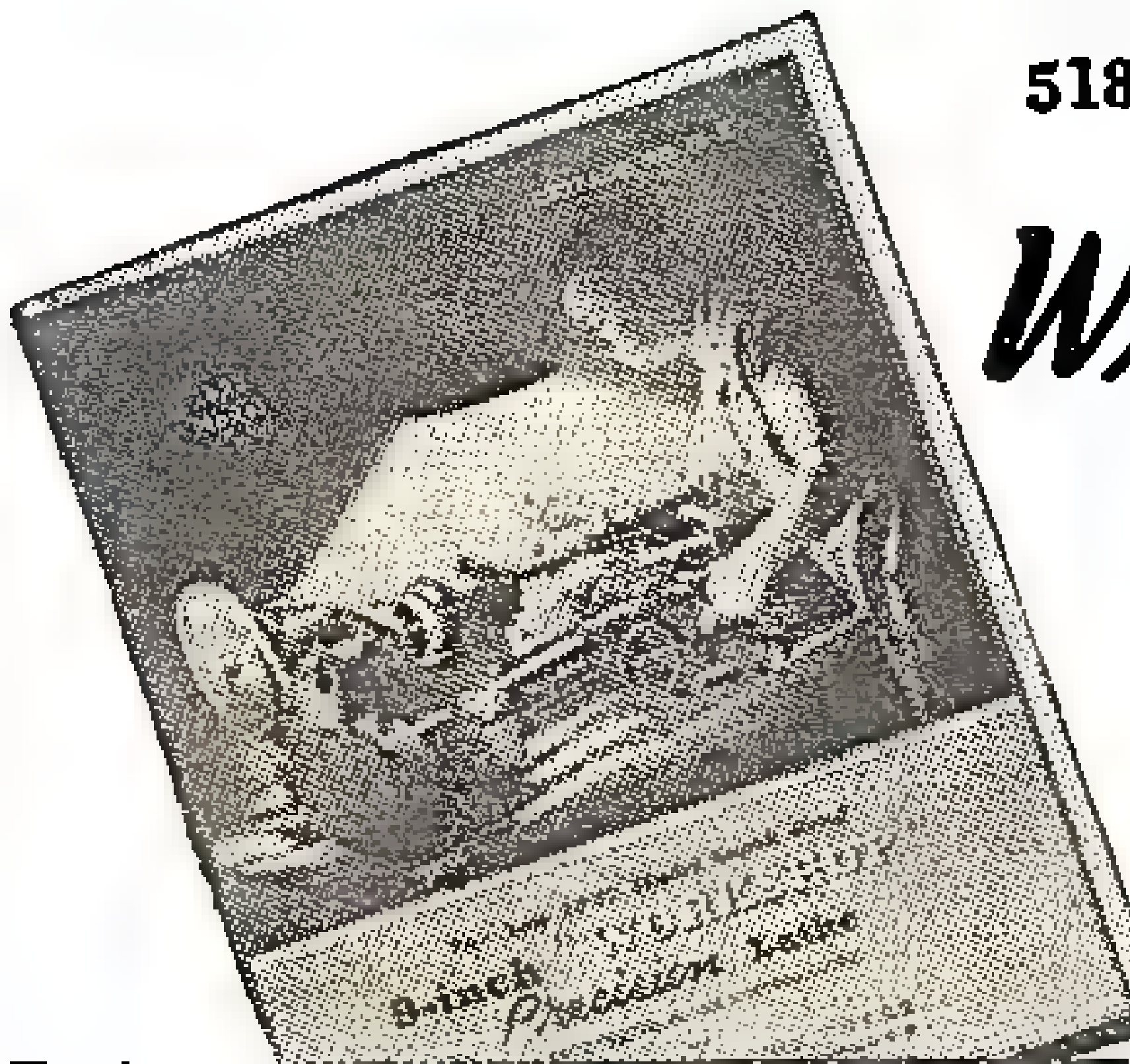
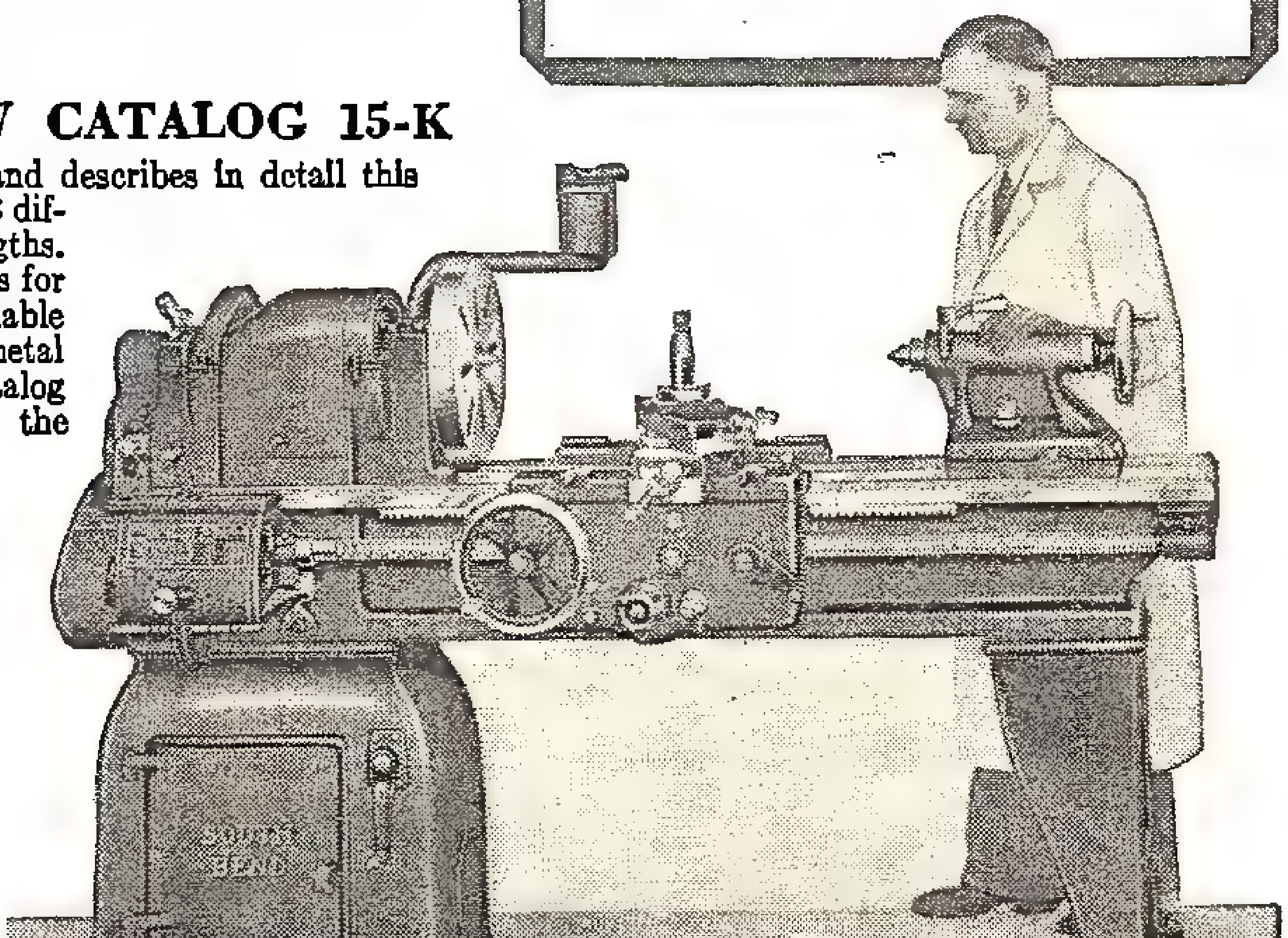


Write FOR NEW CATALOG 15-K

New catalog illustrates and describes in detail this new Workshop Lathe in 8 different drives, 4 bed lengths. Shows the 38 attachments for use with this lathe. A valuable book for all interested in metal working lathes. This catalog **sent free, postpaid.** Use the coupon shown below.



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SOUTH BEND *Precision* LATHES

Science Finds Aid For Deaf

[*Continued from page* 158]

other until 1916, when Boston and Chicago groups were organized, but now there are 160 in this country and Canada. The leagues gained the cooperation of the makers of hearing aids; and now there are wearable ear-phones on the market that make speech really sound like speech, where at first it sounded like the worst of the early phonographs. They impressed their numbers on the theatre owners and the churches; and now there are hearing aids in many of these places with microphones near the speaker; and those who use the receivers often hear the program, service, or music as well as anyone else in the audience.

They called attention to the large number of school children with slightly impaired hearing; and scientists responded with audiometers to discover and classify hearing losses, and educational authorities began to provide lip reading classes and other special attention for children who needed it.

They aroused the interest of the physicians; and men who had contented themselves with treating deafness unsuccessfully began to treat human beings and help them. By recommending a teacher of lip reading, by an introduction to a league for the hard of hearing, by advising in the selection of the right hearing device, doctors start their patients on the road to victory over handicap.

I do not mean that all of these tasks are accomplished. On the contrary, in many places they are not even begun. But enough has been done to demonstrate the possibilities beyond all question. Time, and an aroused public, will do the rest.

Humans Need Little Sun

The vogue for sun baths as a health measure is apparently losing some of its scientific support. The American Medical Association points out that, while sunshine may be beneficial to health, it may also be harmful, and that at least one authority, Prof. Henry Laurens of Tulane University School of Medicine, believes the beneficial effects of sunlight have been largely overemphasized.

Develop Cellulose Enamel

A new cellulose enamel is on the market in Germany under the tradename of "Emailliola" which is said to be insoluble in water, benzine, benzol, alcohol, turpentine and acetone. The material is highly resistant to weathering acids, alkalies and mechanical rubbing. It is non-inflammable and can be applied to wood, paper, pulp, cellulose, metals, tile, stone, plaster and glass.

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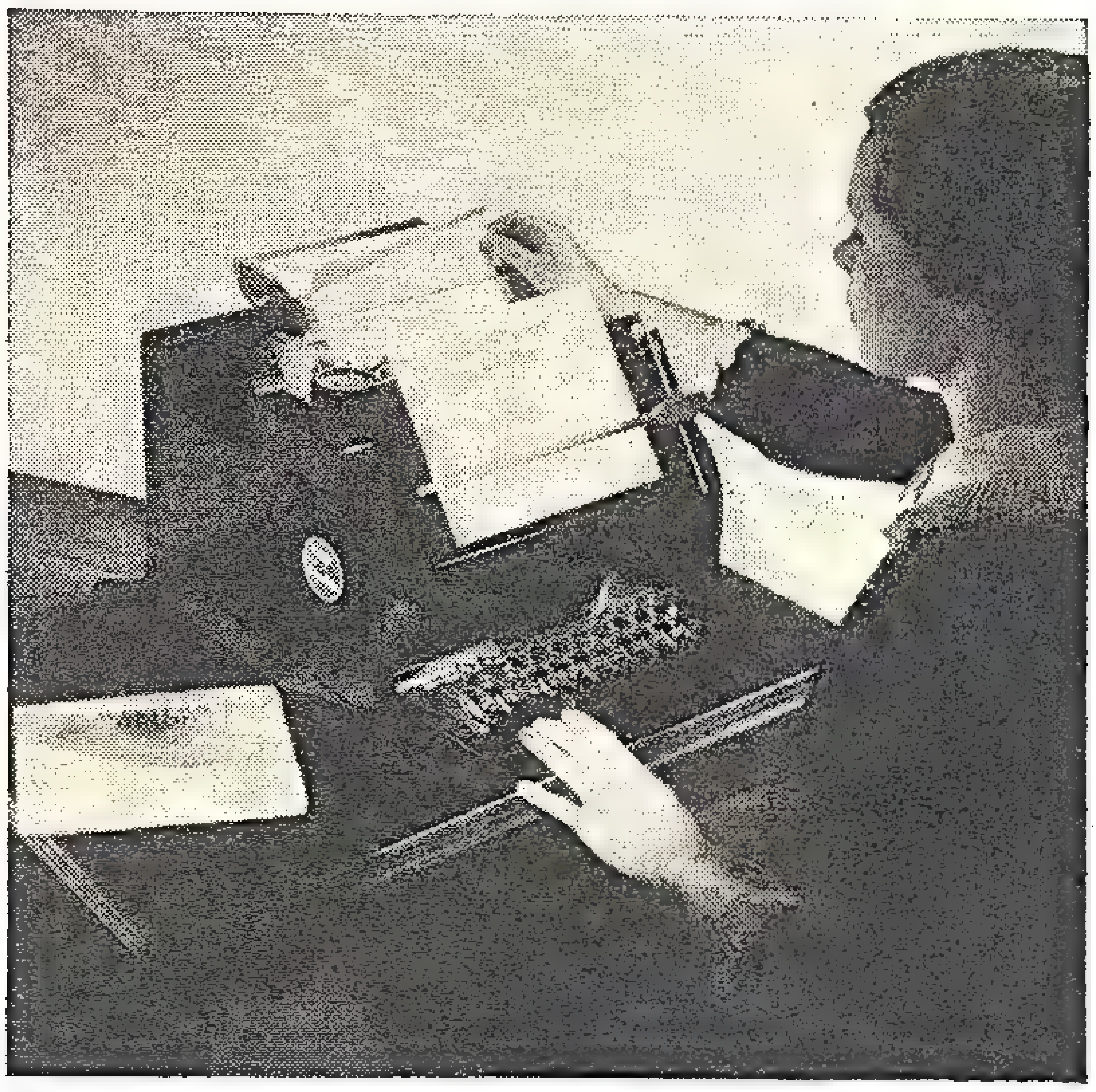
New Ideas Meet Changing Business



Light weight, noise absorption, and reduced fabricating cost are features of this new molded plastic Western Union Teleprinter housing developed by the General Electric Company.

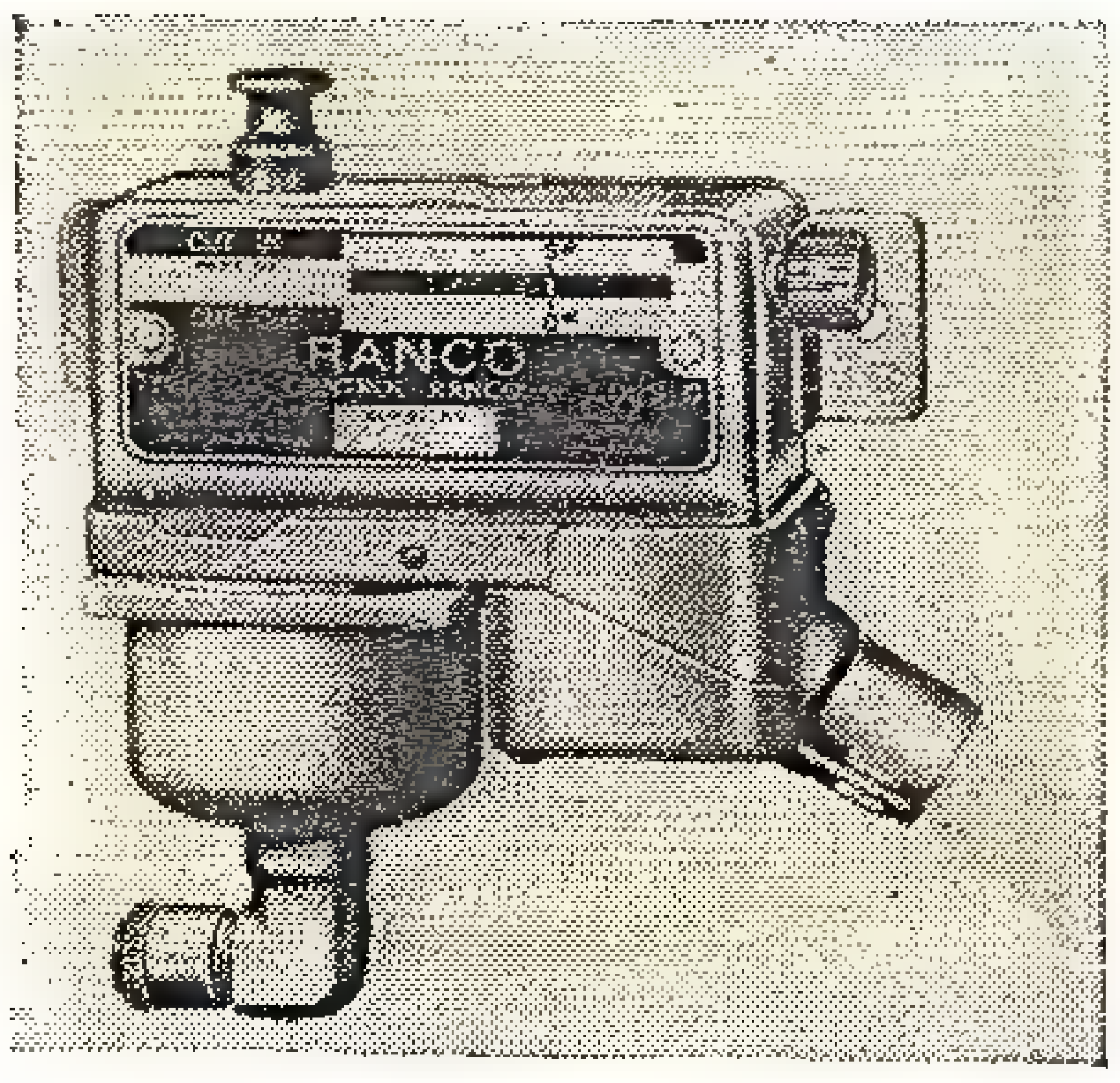
A device for filling sac and vacuum-type fountain pens automatically when the pen is inserted in an inkwell without the filling lever on the pen being used.

An inexpensive valve adapter that enables farm tractor tires to be inflated with a combination of water and air to obtain maximum traction.

A simple lingerie hanger which is shaped to prevent lingerie straps from slipping off of it.

Pre-cast concrete slabs for construction of homes, garages, etc., which considerably reduce building time.

A gasoline-powered industrial tractor capable of developing up to 3,000 pounds draw pull and which travels at speeds up to 10 miles per hour.



This stainless steel, corrosion-proof water thermostat is designed for general commercial use.

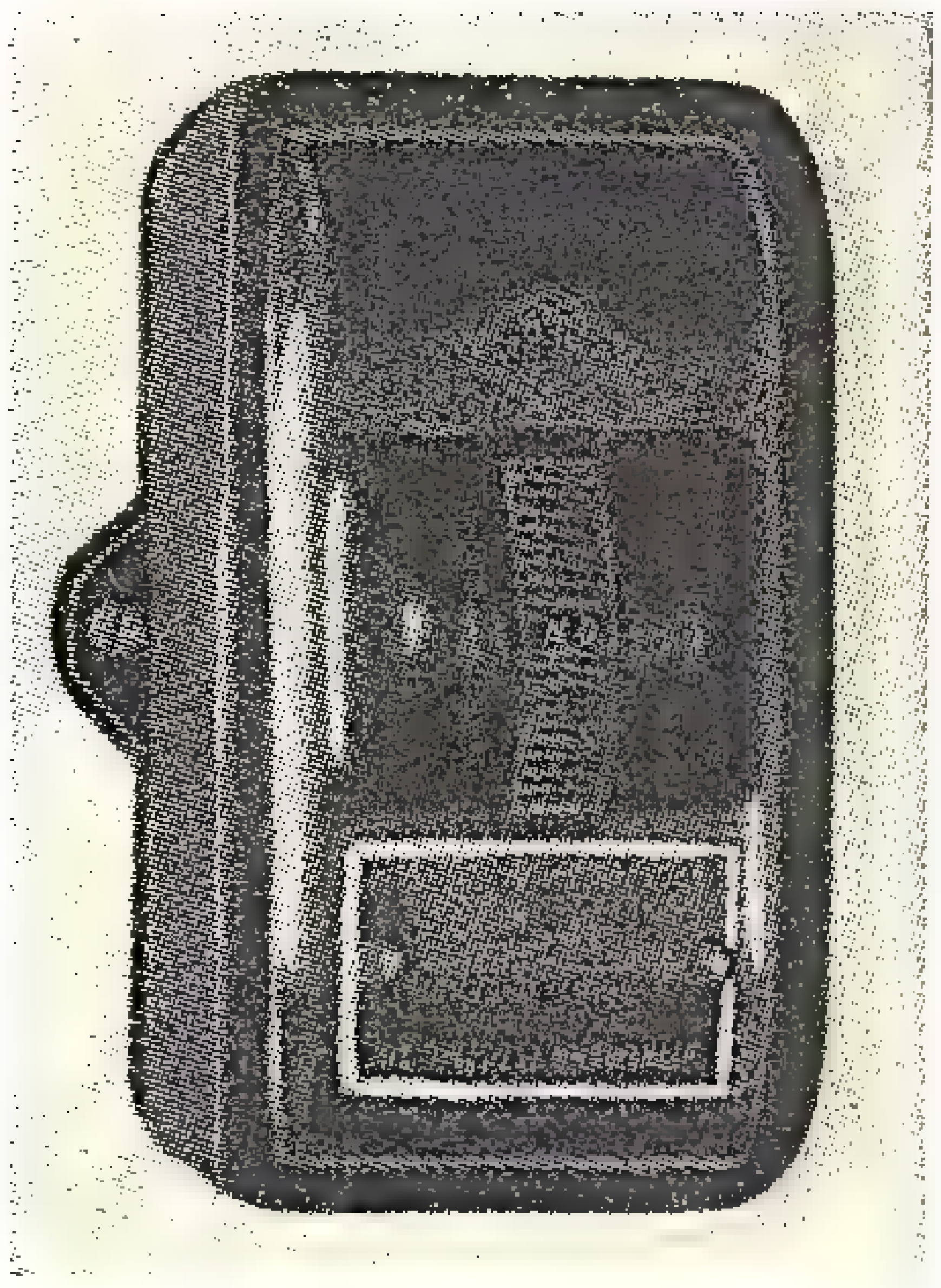
A magnetic separator that removes minute particles from finely powdered products.

A simple collapsible miter box that conveniently fits into a workman's kit.

Black printing ink that is rub-proof and scratch-proof.

A photo-cell device which permits testing of headlights in broad daylight.

A crack-proof putty that expands and contracts according to weather conditions.



This compact circuit-breaker prevents accidental overloads or short-circuits of radio equipment.

A serviceman's kit with mask and chemicals to protect against fumes encountered when servicing refrigerators.

Automatic filing machines that enable the operator to duplicate any type of key.

Hardness testing gauges that measure the hardness of any kind of rubber, cork, felt, and similar materials.

Rubber insulators for use on mechanical equipment to absorb shock and vibration.

Crossing gate barricades that stop autos without damage to car or driver.

Typewriter ribbons made of synthetic textiles that make clear sharp letters and long ink life possible.

Uniformly translucent colored glass that is seven times as strong as ordinary plate glass.

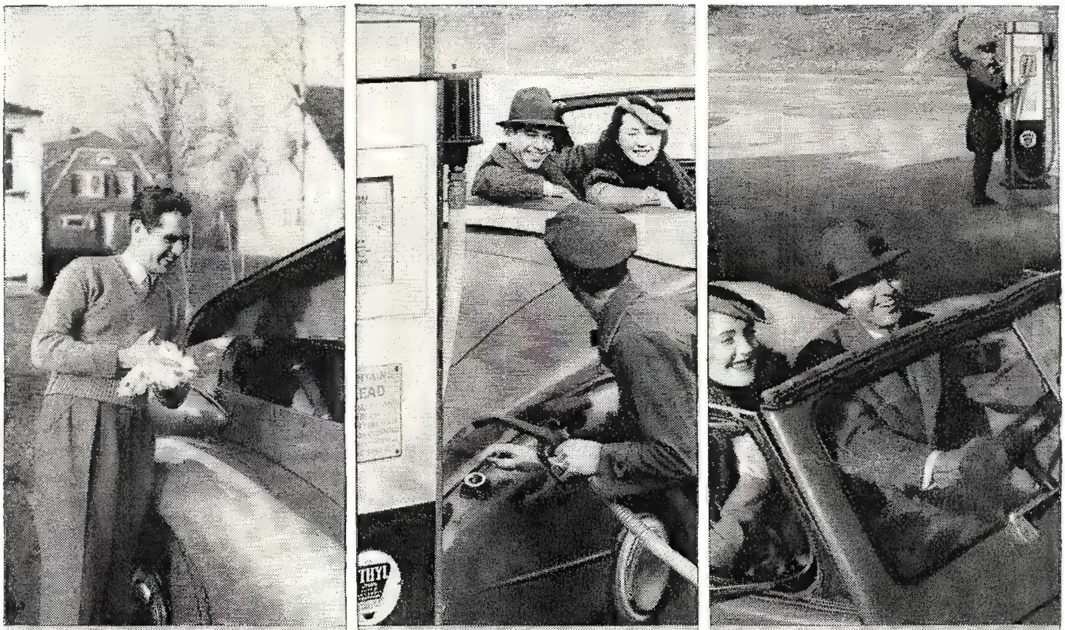
An auto top radio aerial attached by suction cups.

A ferro-alloy compound checks the danger of later corrosion when welding stainless steel.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending a stamped, self-addressed envelope to Modern Mechanix Publishing Co., Information Bureau, Fawcett Building, Greenwich, Connecticut. Manufacturers are invited to submit material for publication on this page.

How to get

A BETTER RUN FOR YOUR MONEY



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Helen Jepson

tells why she chooses a light smoke

"A season of opera and concert means my voice and throat must be consistently in perfect condition. Therefore, although most of my smoking is done while I am on vacation, it is all important to me that I be careful in choosing my cigarette. I smoke Luckies because I enjoy their taste and, because I feel it is wiser for me to choose a light smoke for my voice."

Helen Jepson

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An independent survey was made recently among professional men and women—lawyers, doctors, lecturers, scientists, etc. Of those who said they smoke cigarettes, more than 87% stated they personally prefer a light smoke.

Miss Jepson verifies the wisdom of this preference and so do other leading artists of the radio, stage, screen and opera. Their voices are their fortunes. That's why so many of them smoke Luckies. You, too, can have the throat protection of Luckies—a light smoke, free of certain harsh irritants removed by the exclusive process "It's Toasted". Luckies are gentle on the throat.

a light smoke

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AGAINST COUGH

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A frank man to man talk about

PATENTS-INVENTIONS -SELLING INVENTIONS

THE world of invention moves on. About a hundred years ago people were saying, "There's nothing left to invent"—today we know that is one of the funniest things ever said. Just think what has happened in the last hundred years! Autos, radios, airplanes, and thousands of useful, practical devices for home, shop and office have been invented and put on the market. Inventors are constantly making the world a better place to live in. Did you see a notice in the paper that an obscure worker, Hans Wach, has invented a simple device to utilize exhaust steam on steam boats. *Already, the report states, the steam ship lines have saved more than $15,000 in fuel bills with his invention.* Almost in the same breath the Dept. of Commerce announces that it will soon test out a new non-crashable aeroplane, which the average man can learn to fly in a day, which will travel at 110 miles an hour and sell at the price of a cheap automobile. An unknown Seattle man has invented a robot to go 5,000 feet under the sea and recover millions and millions of dollars worth of gold lying at the bottom of the ocean since the days of the early Spaniards.

Remember this: For every outstanding big invention there are thousands of small, simple things for use in the home, the office, the factory, on the farm, on every sort of travel conveyance. Little articles like you find on the counters of a 10-cent store, hardware store, drug store, toy and novelty shop.

Many Little Ideas Have Big Commercial Possibilities

A person finds something he's using doesn't work right, or it's clumsy, or costs too much. He gets a happy thought. He improves the old Article. That's contribution to human progress. That's the way that many, many men have reached the goal of financial comfort, independence and even wealth. Most of the things millions of us use didn't come from the brains of engineers and physicists. They came from the mind and maybe the crude home work bench of Mr. Average Man, busily engaged in earning his bread and butter at whatever chance or circumstance has given him to do. The "little" man's opportunity as an inventor was never greater than it is today.

Who Are Inventors?

You'd be amazed at the men we contact in the course of a busy year. Most of them do not consider themselves inventors at all. During their work or leisure they get an idea. They work it out on paper. They get in touch with us about Protection. Did you know that a dentist invented the stock ticker, a school teacher the telephone, a farmer the typewriter, an artist the telegraph? Did you know that the crinkly hair pin—sold by millions now—came about because a husband saw his wife twisting the old-fashioned straight hair pin to make it stay in place? **Poor men who have no thought of invention now will be financially well-fixed in a few years because of a happy thought that the world could use to advantage.**

Can You Answer These Questions?

Ask yourself these questions: How do the Patent Laws protect me? What easy steps can I take, without cost, to put myself in position to support my belief that I am the *first* man to think of *my invention?* Is a Patent worth the cost? Do I need a model? Should I try to sell my invention before I have it Patented? Is there any safe, business-like way to secure financial help? If I do apply for a Patent how shall I reach people who can market my invention? Can I protect and sell an improvement on some invention that has already been patented? These are but a few of the questions which usually confront the average man. You need the answers! **YOU CAN HAVE THEM, without cost, trouble, or delay.**

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For more than thirty-six years, this firm has been helping men with an inventive turn of mind. We maintain a large staff of trained, experienced specialists—**Registered Patent Attorneys, Draftsmen, and Searchers to help our clients secure all the protection to which they are entitled.** Fees are reasonable. Deferred payments frequently arranged. Questions promptly answered. Write us frankly with absolute assurance that what you say will be treated with strictest secrecy. **But FIRST, send for the FREE BOOKS shown on the opposite page.** They are filled with facts, pictures and suggestions. They tell you things about Patents, Inventions and Selling Inventions that we have learned in our long experience. **They may save you time, expense, EVEN LATER DISAPPOINTMENT. Simply fill in the coupon. No charge, no obligation. Write us today.**

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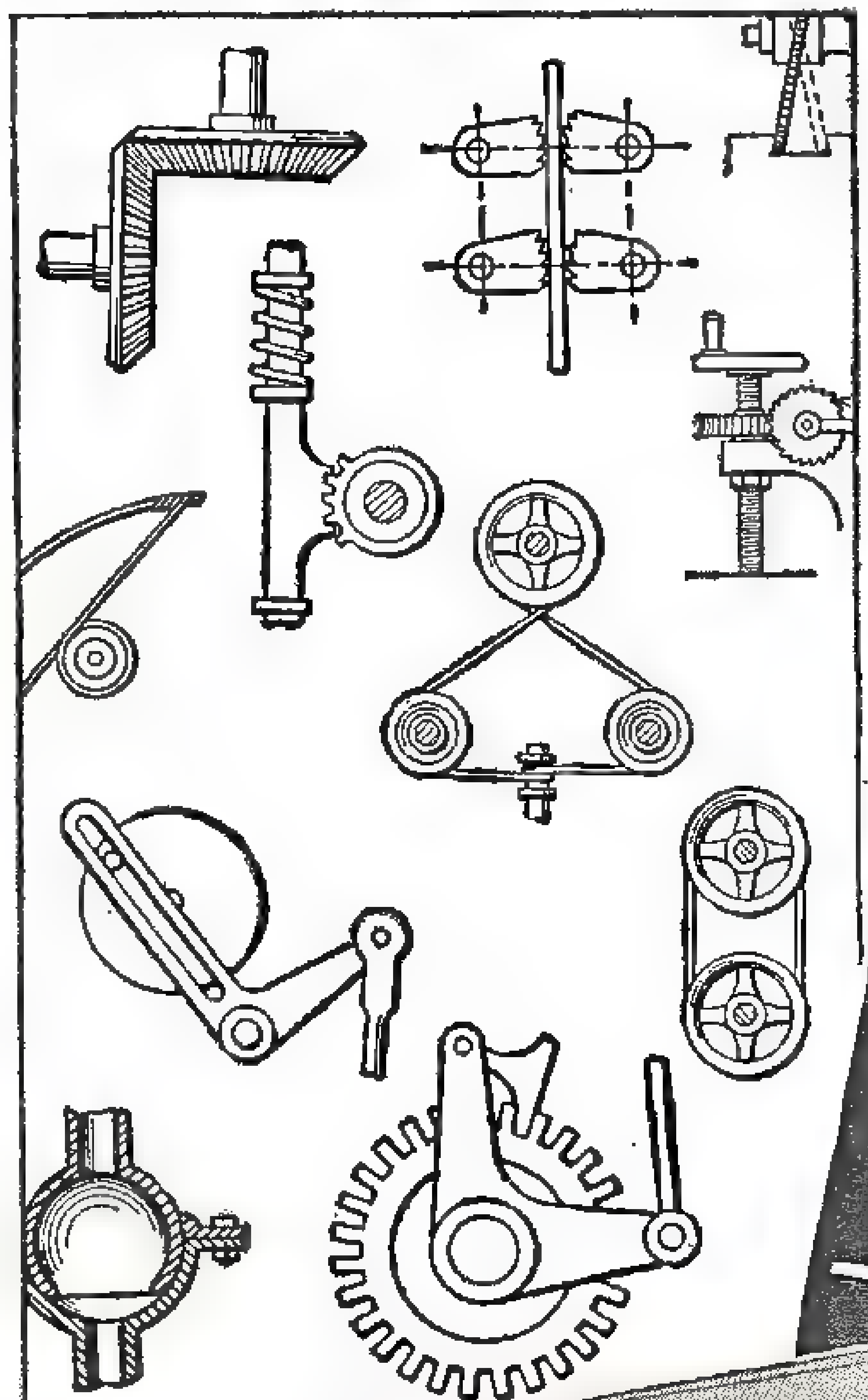

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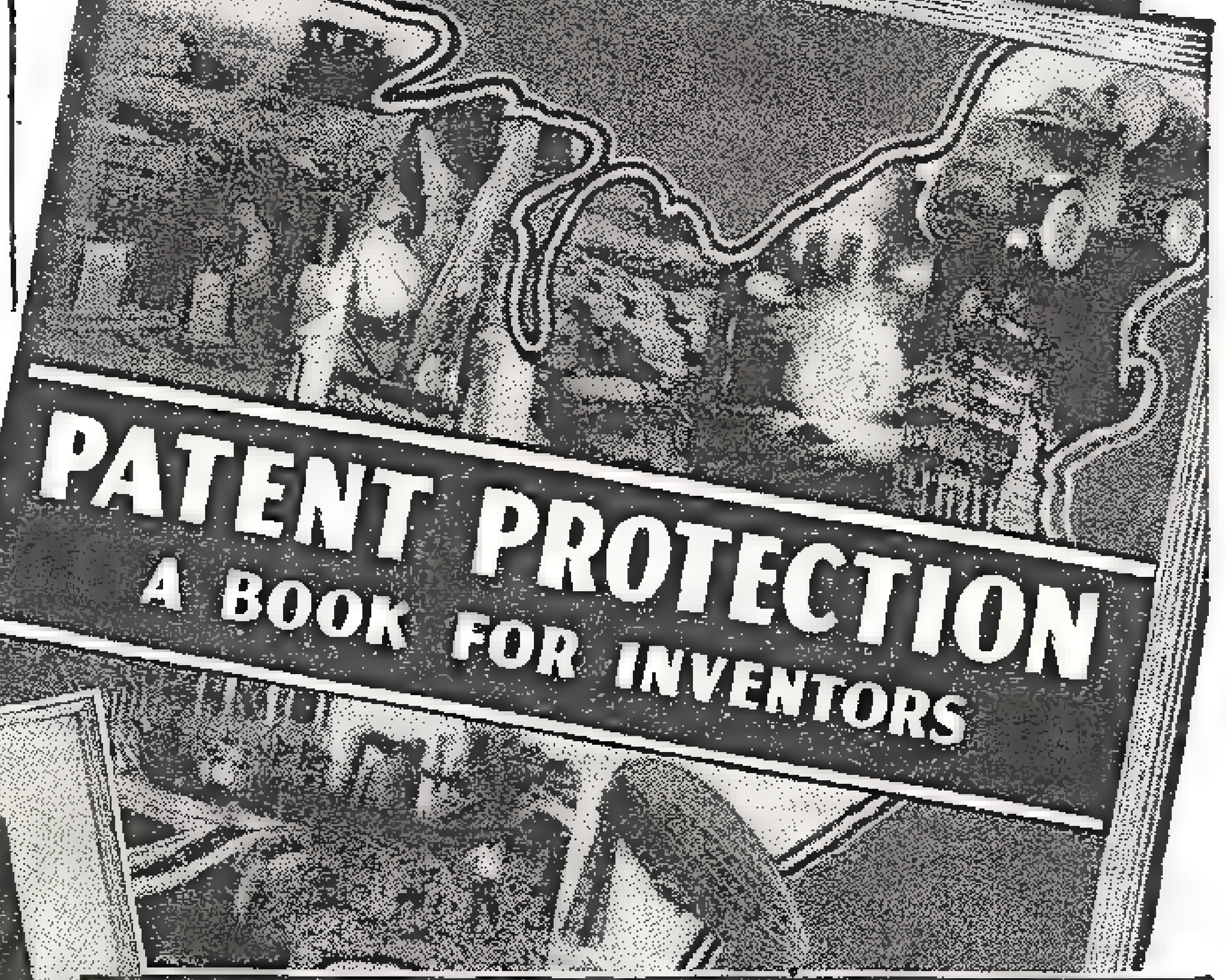

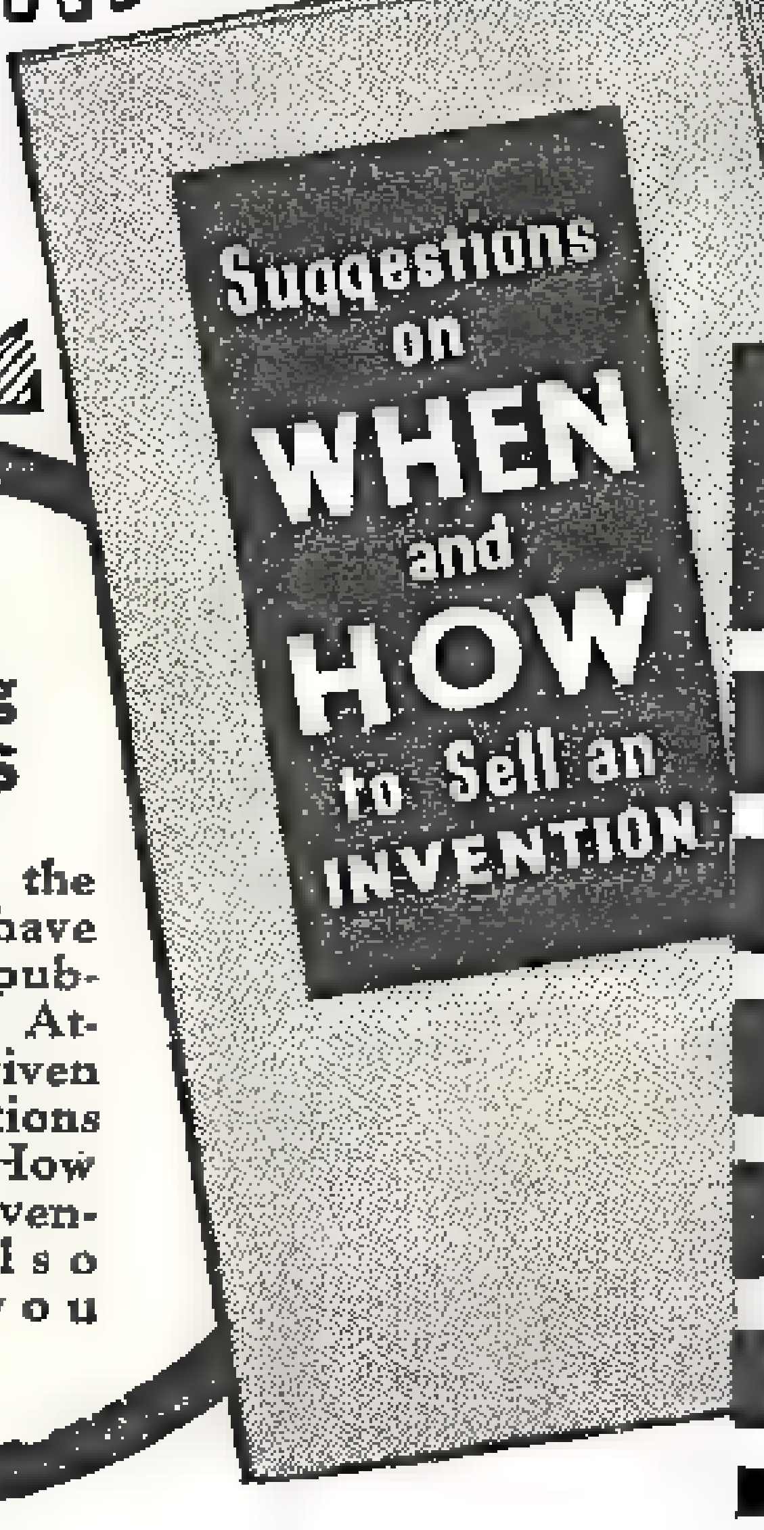
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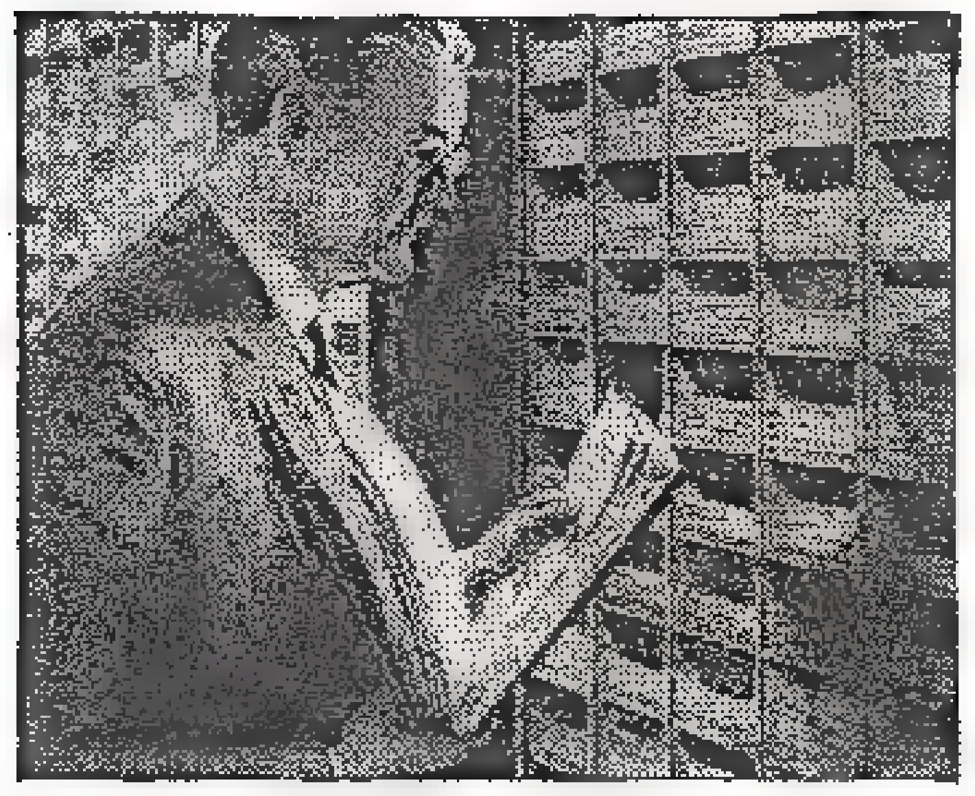
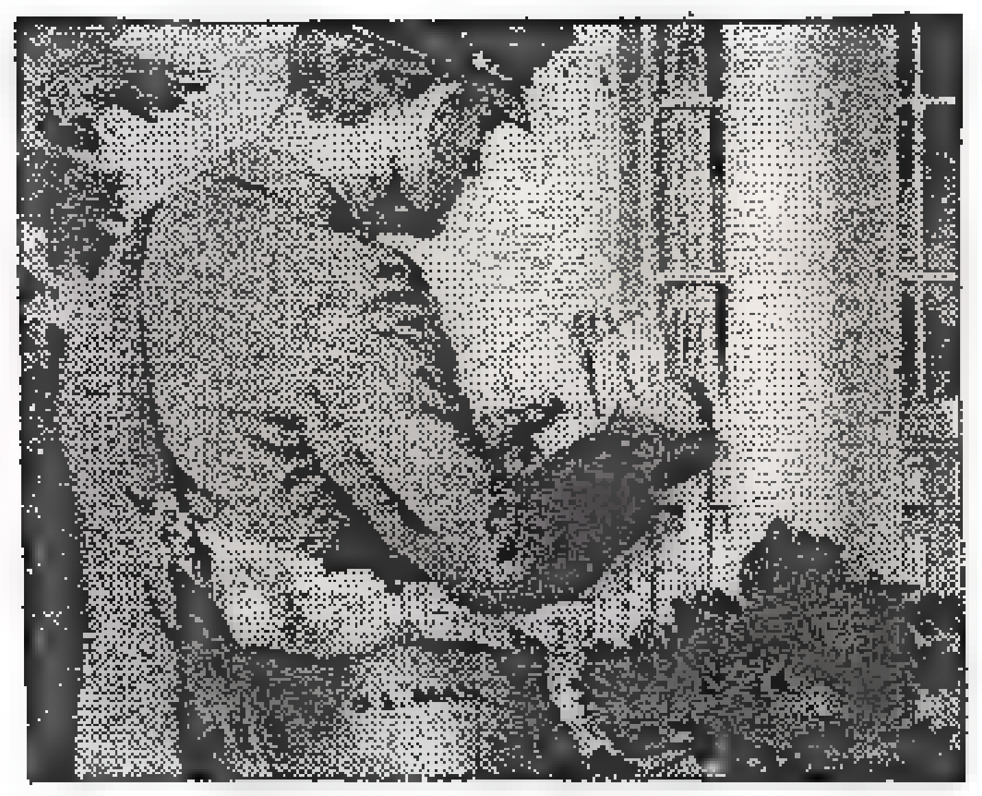
INVENTORS

STEP NO. ONE
Make a rough pencil sketch of your invention, describe it fully, and send it to us for preliminary search through United States Patents in the U. S. Patent Office.



STEP NO. TWO
Our trained searchers will then make a preliminary search of the pertinent U. S. patents to determine if your invention is probably patentable.



STEP NO. THREE
Our complete report of search and opinion on patentability will be mailed to you with copies of U. S. Patents that we consider nearest to your invention.

STEP NO. FOUR
If you decide to make patent application, for customary fees explained in our booklet, our draftsmen will make drawings and proper papers will be prepared for presentation of your invention to the Patent Examiner in U. S. Patent office.

KNOW HOW TO START
KNOW EACH STEP TO TAKE

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Very often, the patent procedure is what we call a "simple" one—as illustrated here. Our FREE BOOK, "Patent Guide for the Inventor," describes what to do and how to go about it. Send for it by all means—let us urge, however, that you take the first step (Step No. 1 at left) without further delay. It will prevent wasted work, mis-steps, and going ahead "in the dark"—your whole patent procedure depends upon the first step.

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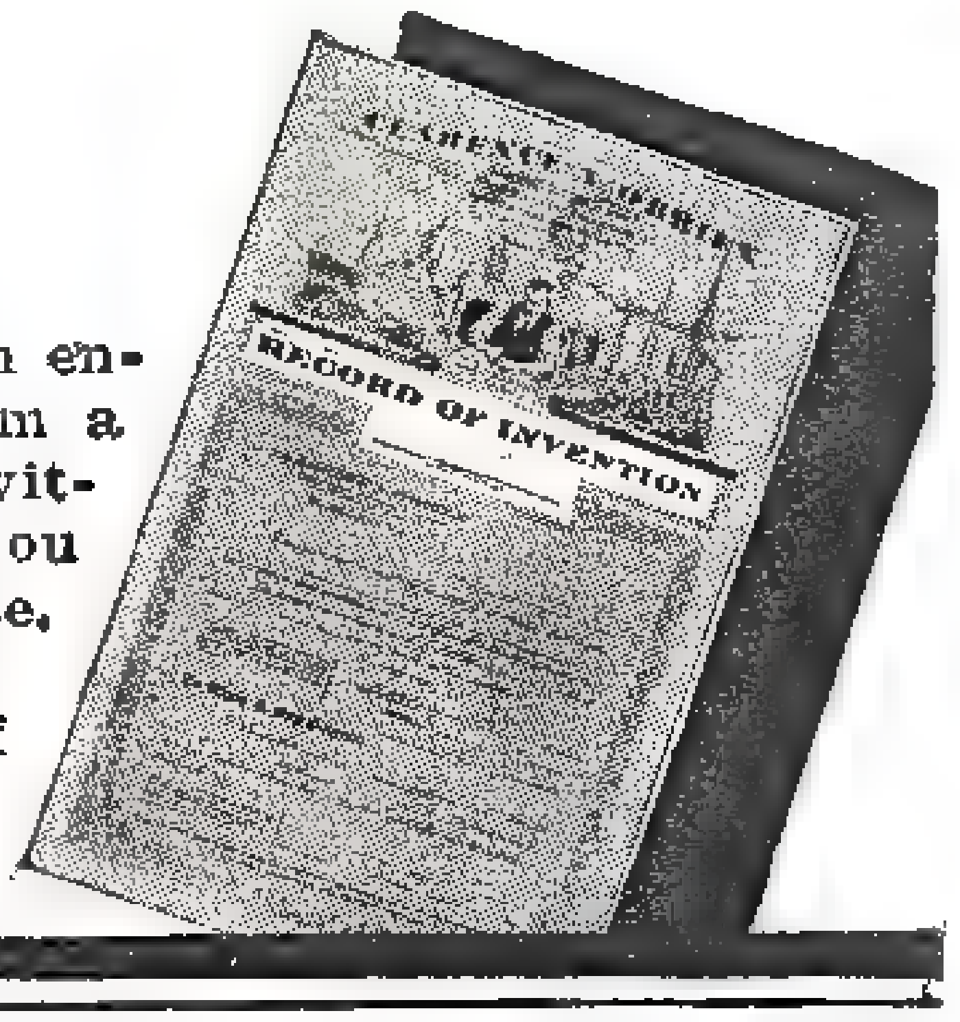

CLARENCE A. O'BRIEN & HYMAN BERMAN

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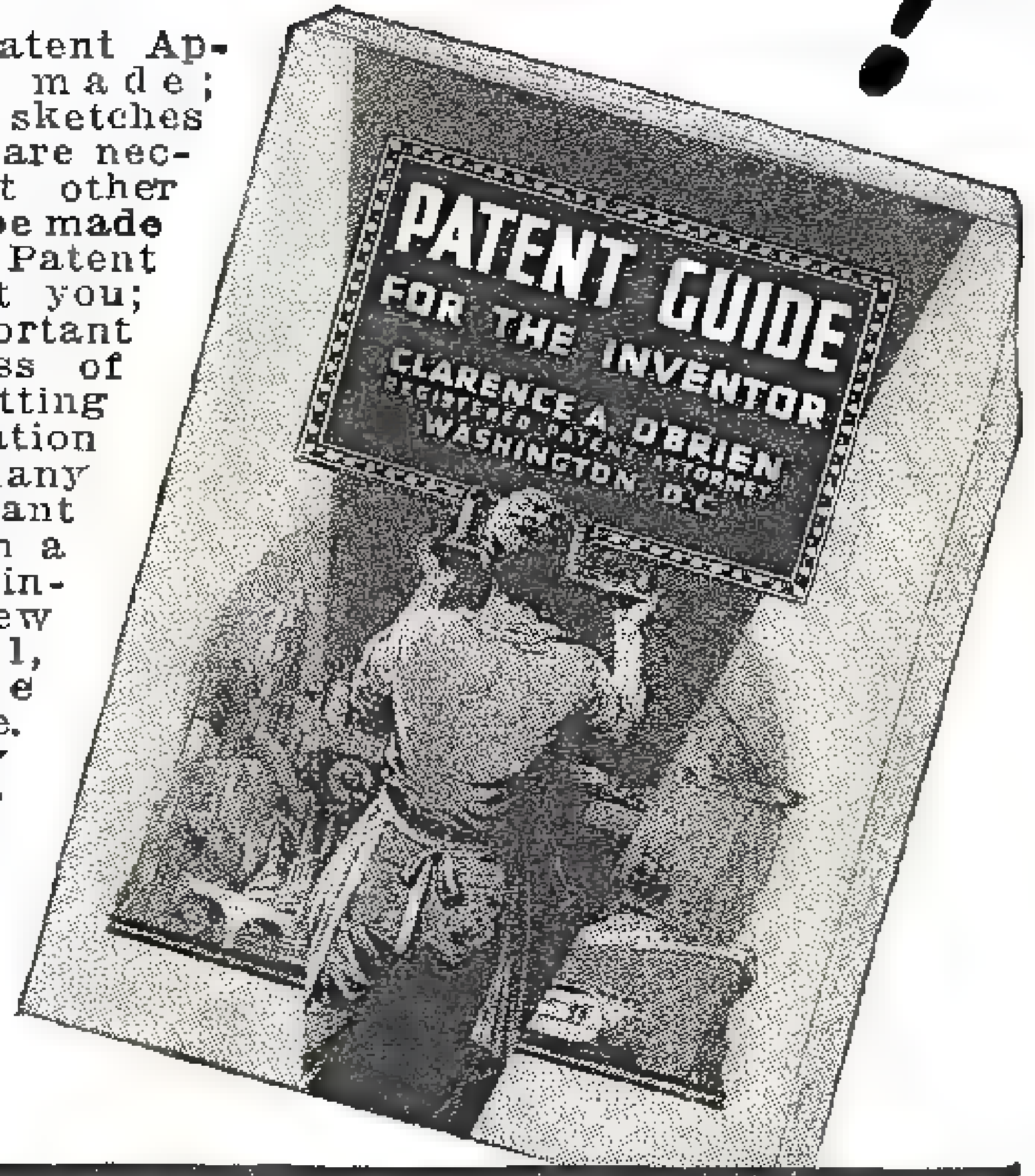

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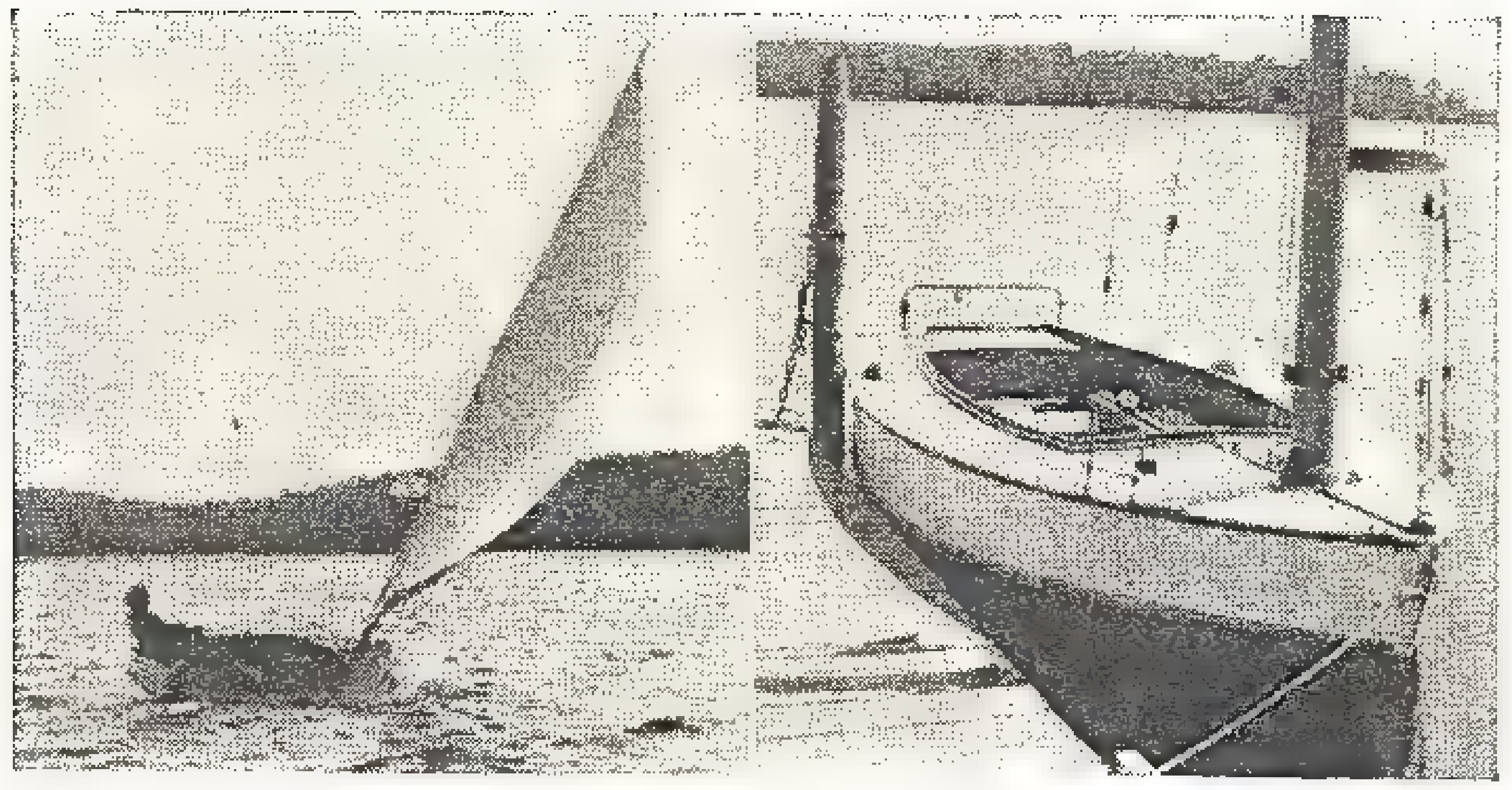
Random Chips from the Editor's Workbench



Sailing, sailing—and Raymond Smedberg, of Centredale, R. I., does plenty in the Olympic V-bottom boat he built from MM plans. Close-up and sailing views show boat's beautiful lines and excellent construction details.

JUDGING from the increased number of letters and photos received by the Workbench, it is apparent that many home craftsmen are entering a period of renewed activity. Perhaps the approach of Spring has something to do with it, inspiring workshop fans to hastily complete projects started during the cold winter months so that they will be ready to enjoy every possible minute on the open road, lakes, woodlands, and seashore.

Without a doubt, the boats, midget autos, trailers, and other interesting outdoor projects, of which we have seen photos, are going to provide some mighty enjoyable days for many readers who have been poring over MM plans and working with lathe, power saws, and the lowly hammer and nails.

To readers who have completed projects we extend congratulations. To those who have not we again say that it is never too late to start. No matter what season of the year you will find interesting articles and plans in every issue of MM, or in any of the books—"How To Build Trailers," "How To Build 20 Boats," or "How To Build It," which can be secured direct from the MM office in Greenwich, Conn., at the popular price of only 50c each.

***

Heading the list of Workbench prize winners this month, Raymond B. Smedberg sent in photos and a letter that were awarded first prize of $5. He writes:

Centredale, R. I.

Dear Editor:

Enclosed are photos of my Olympic monotype V-bottom catboat that I built from MM boat plans during my spare time. The sails, too, are made according to MM plans.

The boat has proved very satisfactory on salt water as well as fresh water and an old sailor who tried it out stated that it was the best small boat he ever sailed. It is very seaworthy and handles well in light or strong winds.

Building your own boat is easy and economical when MM boat plans are used. Thanks to MM for putting out really easy-to-understand plans.

Raymond B. Smedberg.

The combination of good boat plans and Smedberg's craftsmanship has certainly resulted in a sailboat of beautiful lines and seaworthy characteristics as the photos plainly show.

***

The height of the trailer season will soon be upon us and W. Thrasher, of Hamilton, Ontario, Canada, has made ready for it by constructing a streamlined trailer. In his letter which was awarded a $3 prize, he says:

Dear Editor:

I am instructor in carpentry, joinery and building at Hamilton Technical Institute and would like to receive an MM blueprint catalogue.

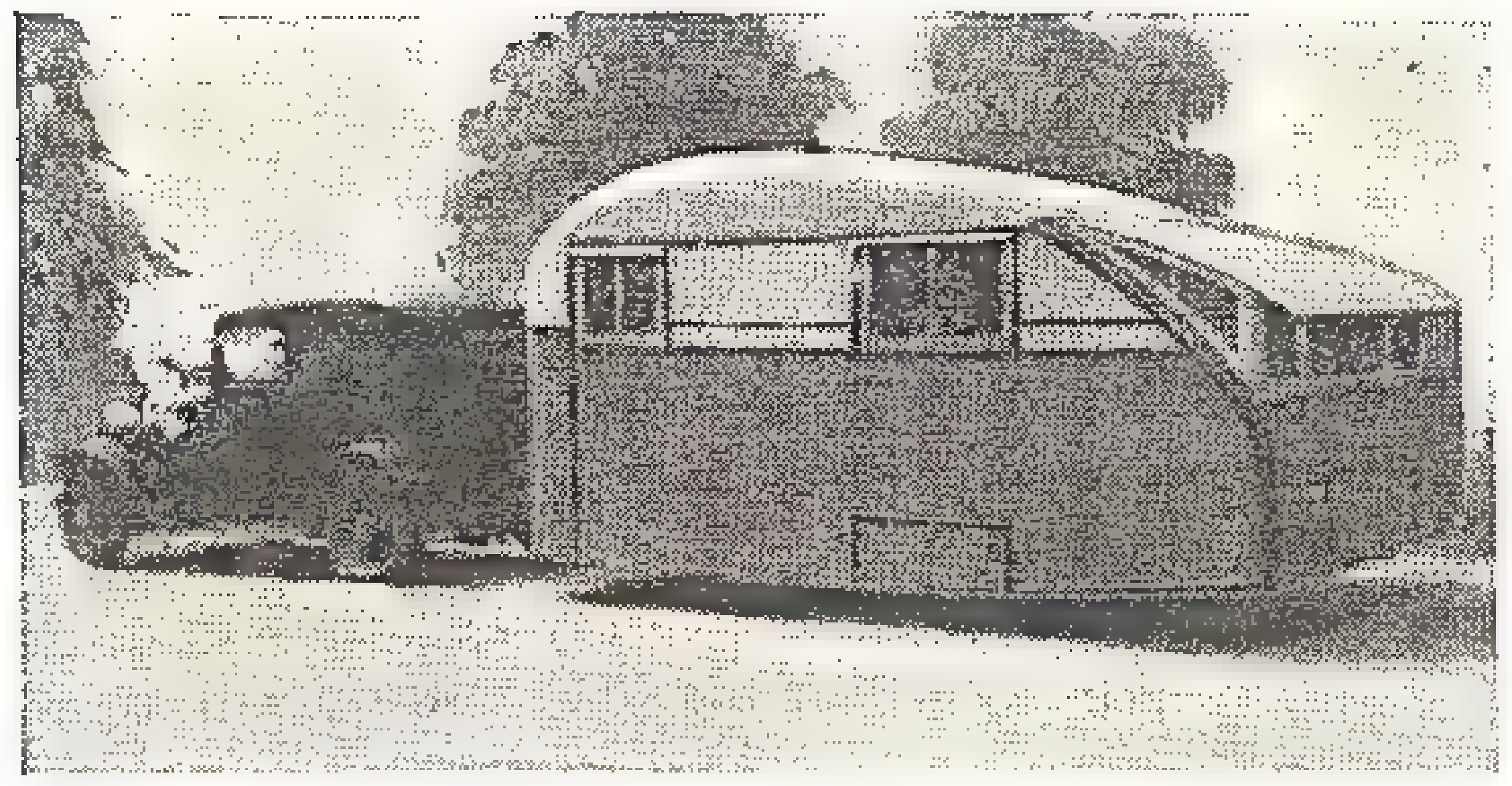
My students are particularly interested in trailers, planes, and boat building. I am sending a photo of a trailer built in spare time. The top folds down at the rear end to give a streamlined effect when traveling.

W. Thrasher.

The booklet has been mailed to Mr. Thrasher and we know his students will find projects that will provide ample outlet for their energies and craftsmanship.

***

A prize of $3 was awarded to Orville W. Odle, of Hartford City, Ind., whose letter states:



Featuring a rear top that can be lowered to create a streamlined appearance when traveling, this roomy trailer was built by W. Thrasher, a teacher in Hamilton, (Ont.) Canada.

Dear Editor:

Enclosed is a photo of a pedal locomotive made from plans that appeared in MM. It was made in a basement with common tools and has bronze bearings.

Heavy enough for a ¾-horsepower engine, the locomotive stands 46 inches high and is 94 inches overall length.

The locomotive is very realistic in appearance and you can imagine how my five-year-old son's eyes "popped" when he first saw it. The American Legion asked for permission to take the model to their state convention.

Orville W. Odle.

Yes, we can very well imagine how many little eyes would "pop" if they were fortunate enough to see a miniature locomotive that can be pedaled along the streets. Good work, Mr. Odle.

***

Midget racers still appeal to many home workshop fans and a letter and photos describing a finely built one won a $3 award for J. R. Halley, of Philadelphia, Pa., who says:

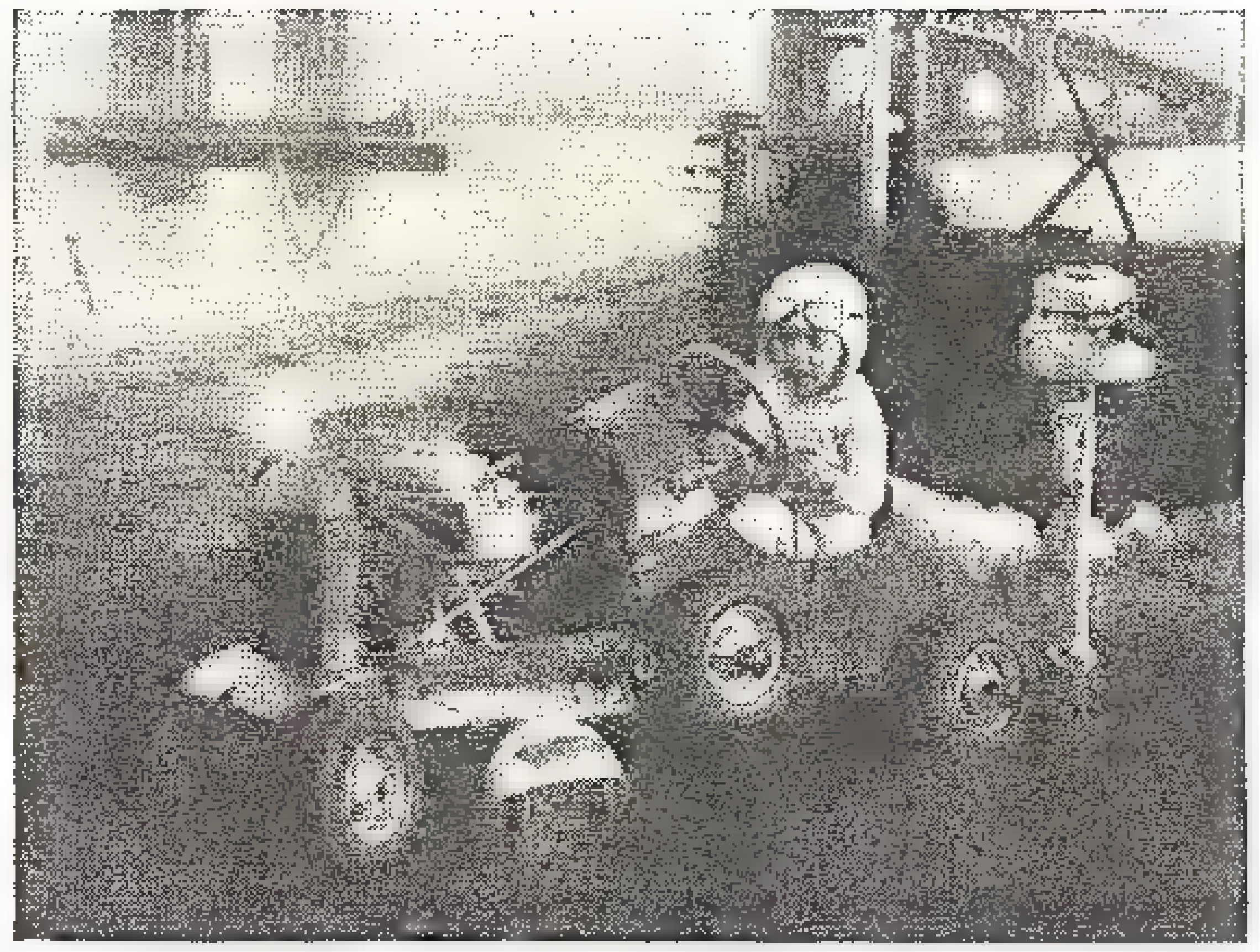
Dear Editor:

Reading your magazine has been great, but when you talk midgets you want to consult Philadelphia. I am sending you a photo of what we consider a real midget.

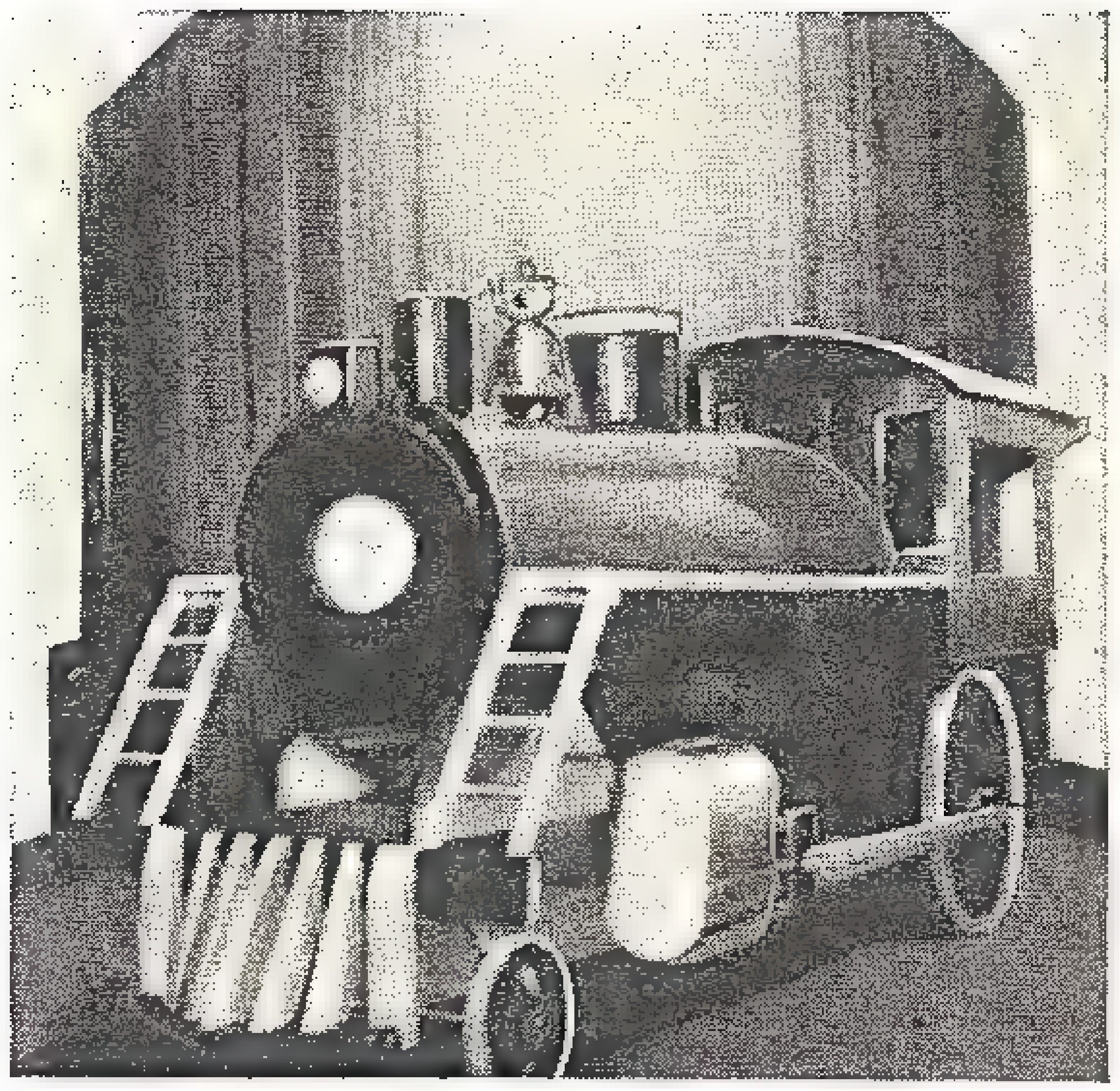
The midget racer is 64 inches long, has brakes, clutch, gearshift, etc., and is powered by an outboard engine. It will attain speeds up to 50 m.p.h.

J. R. Halley.

The arrangement of the outboard engine to power Halley's midget is novel, and we must confess that it really is one of the smallest racers we have ever seen.



A real midget racer, as can be judged from the tiny tot occupying the cockpit, is this one built by J. R. Halley, of Philadelphia, Pa. Note arrangement of its outboard power unit.



Lucky are the youngsters who have fathers who can build them a pedal locomotive like this one. Orville W. Odle, of Hartford City, Ind., built this realistic engine from MM plans.

On behalf of the Auckland Model Airplane Club, Winston B. Mackley, of 8 Ascot Lane, Remuera, SE 2, Auckland, N. Z., wishes to invite correspondence with MM readers who are serious model builders.

The Auckland Club, as many readers will recall, sent a team over to the U. S. last year to win the coveted Moffett Trophy at the National Contests held in Detroit, Mich. If you are really interested in model plane building here is your chance to correspond with members of a club that rates ace high in the hobby. Enclose a stamped addressed return envelope with your letter to Mackley.

***

Another $3 prize winning letter was sent in by Robert O. Lewis, of Troy Hills, N. J., who writes:

Dear Editor:

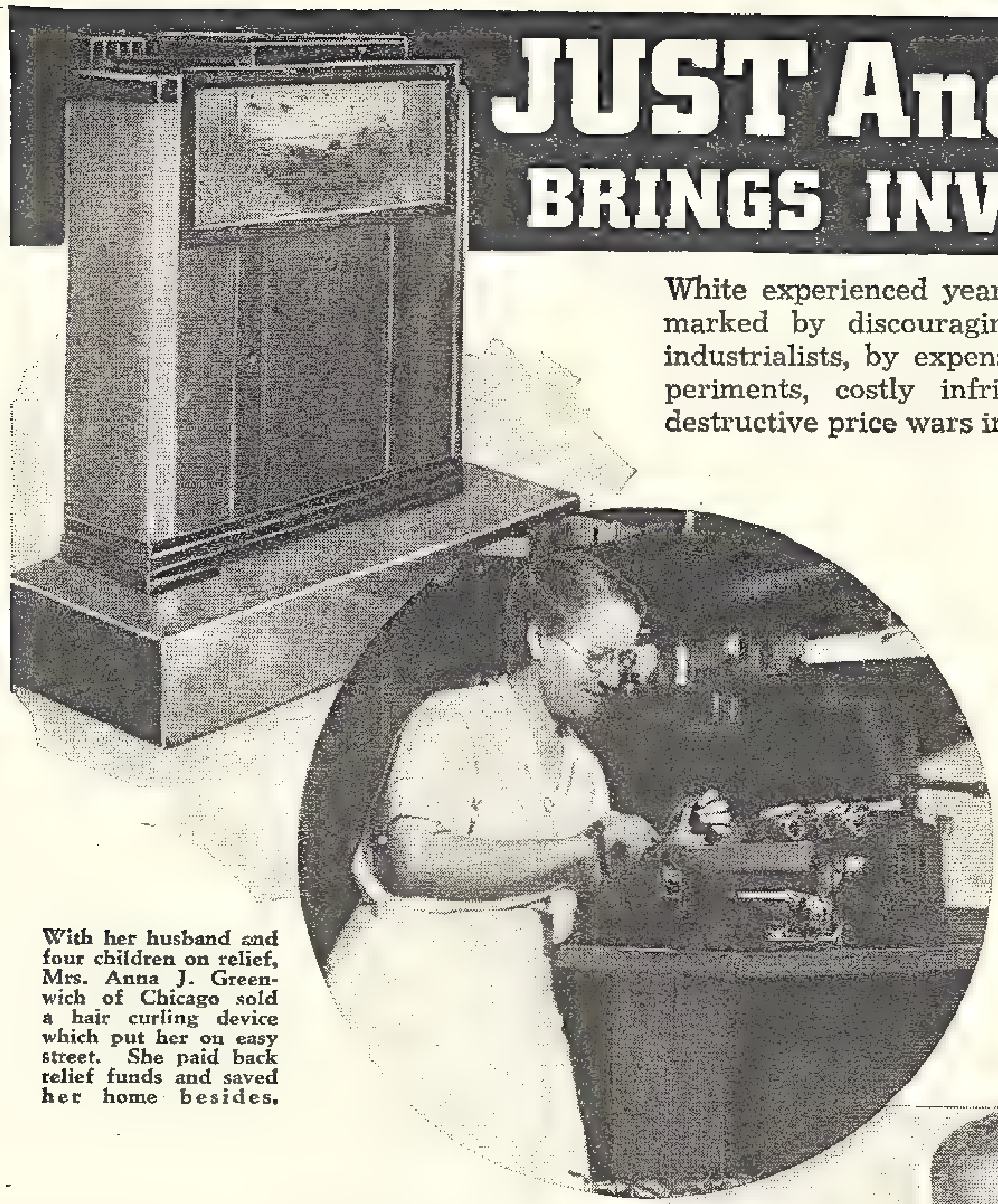
I am sending a snapshot of the sail rig for canoes which I made from plans that appeared in MM. The entire cost was less than seven dollars.

I used the rig to outsail two other canoes that featured different types of rigs. Contrary to the general belief that a canoe is dangerous with sail, I find it unusually stable, due of course, to the lee-boards that are used when sailing. I cannot give this rig too much praise and heartily recommend it to anyone who has a canoe. There is no end of fun and thrills.

Having been an MM fan for years, I keep all the

[Continued on page 26]

JUST Another GADGET BRINGS INVENTOR $350,000.00



With her husband and four children on relief, Mrs. Anna J. Greenwich of Chicago sold a hair curling device which put her on easy street. She paid back relief funds and saved her home besides.

by H. H. Slawson

ANOTHER gadget has rung the bell and brought its inventor a fortune. This time it's a 70-year-old grandmother, Mrs. Birdora H. White, of Chicago, who draws the big prize.

After a 20-year struggle for recognition, Mrs. White has sold for $350,000 the exclusive right to the use of a simple little buckle of her invention on overalls and work garments made by one manufacturer. She still holds other valuable rights in the patent.

So simple does the buckle look that judges in the Patent Office at Washington were almost affronted and scornfully asked, "Why bring that in here?"

"Just another buckle," one of them exclaimed as he disdainfully fingered the model and recalled how he had a buckle "just like that" on his jeans 50 years ago.

Attorneys convinced the court otherwise, however, and a patent was granted. Then Mrs. White experienced years of ups and downs, marked by discouraging rebuffs from big industrialists, by expensive promotional experiments, costly infringement fights and destructive price wars in the buckle business.

It was in 1915 that the idea for her buckle first came to Mrs. White. After 15 years as a widowed school teacher with four children to raise, she had started, at 50, to learn the corset business. Within three months she had designed an improvement on a "clumsy" hose supporter.

"When I showed this to a friend," she relates, "she remarked that it would make a wonderful overall buckle. Then I began noticing how men use bent nails, slivers of wood or big knots to help hold up their overalls. So I started figuring on a buckle suitable for such garments.

"More than once in the discouraging years that followed I was tempted to forget it. I was spending the best part of my life on a little buckle and not getting anywhere. I never see a little gadget now without wondering if the inventor suffered all the grief I went through."

Mrs. White's success is not unusual. The rubber tip on your pencil, the clip on your pen, the rubber-wrapped button on your garters, the snap fastener on your gloves, the zipper on your jacket, that collar button which turns down in the back, your suspenders, your safety razor have all brought Aladdin-like fortunes to their inventors. Gillette, of razor fame, for one, is said to have made $2,500,000 annually, for years.

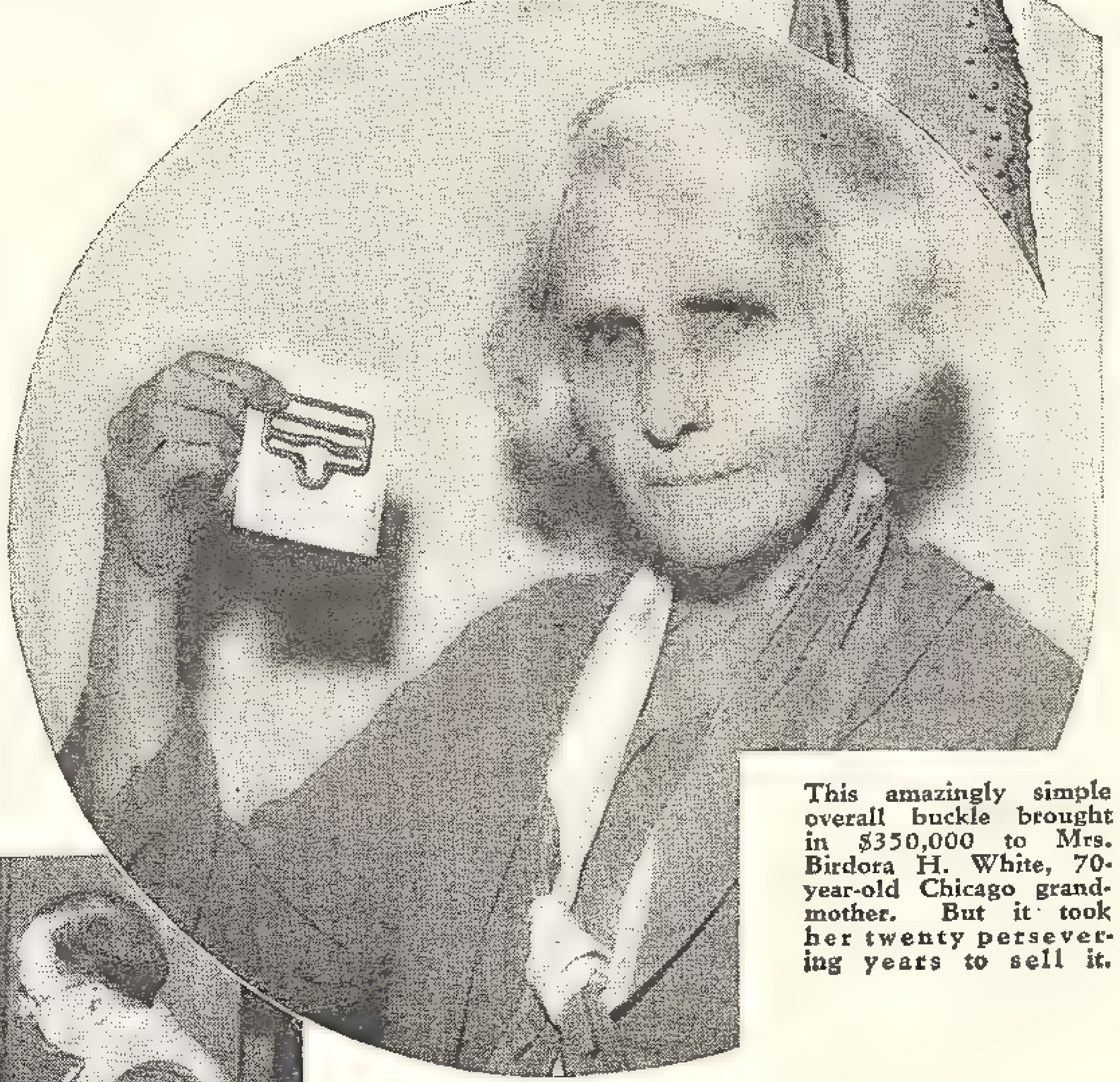
Chicago alone, where Mrs. White lives, has been peculiarly prolific in producing outstanding inventors who started in a humble way. One thinks of Pullman and McCormick, of Charles E. Scribner, of the Crane brothers, of William Seelig, Lee De Forest and Vincent Bendix. Almost daily that city's honor roll grows.

From Colorado came two brothers, O. S.

[*Continued on page* 144]

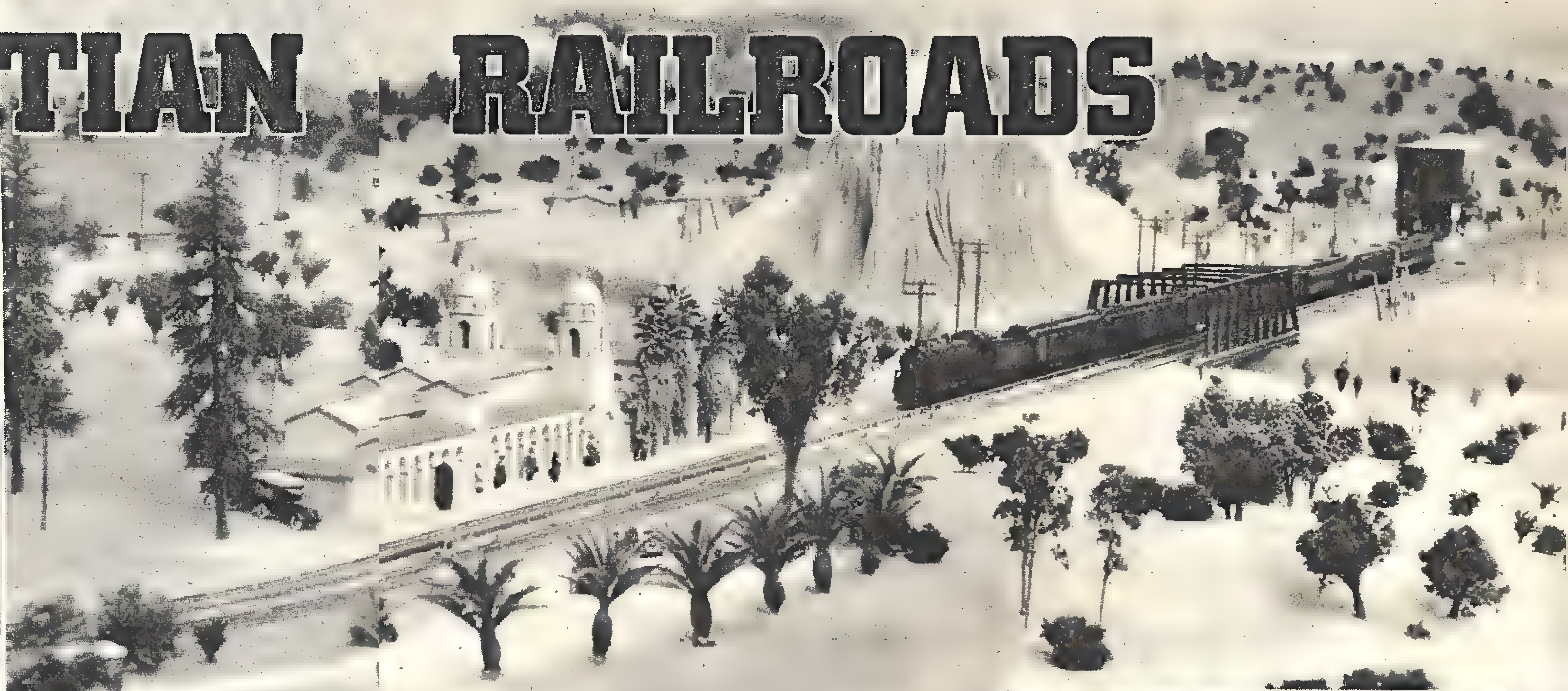
Dr. Vladimir Zworykin with his "bottled television" cathode ray tube. The broadcast pictures appear on the large end, and then are projected onto a mirror.

Dr. Willis R. Whitney, who has invented a way to put radio waves to work curing lame muscles and joints caused by hard calcium substance in the body "oil."



This amazingly simple overall buckle brought in $350,000 to Mrs. Birdora H. White, 70-year-old Chicago grandmother. But it took her twenty persevering years to sell it.

Building LILLIPUTIAN RAILROADS



William Pinter, of Garwood, N. J. (circle), proudly exhibits his Tiny Tom 00-gauge locomotive and tender built from MM plans. The popular model is patterned after a Southern Pacific Railroad engine.

A general scene (above) on one of the 0-gauge systems built by Minton Cronkite, of San Marino, Calif., who has the largest individually owned model railroad in the U. S. So realistic is the system that the Sante Fe Railway borrowed it for display. purposes at the Texas Centennial Exposition. Right—Like a view from a signal tower is this stretch of "pike" as seen from overhead.

No Child's Play Is This Fascinating Hobby, But a Challenge of Ability.

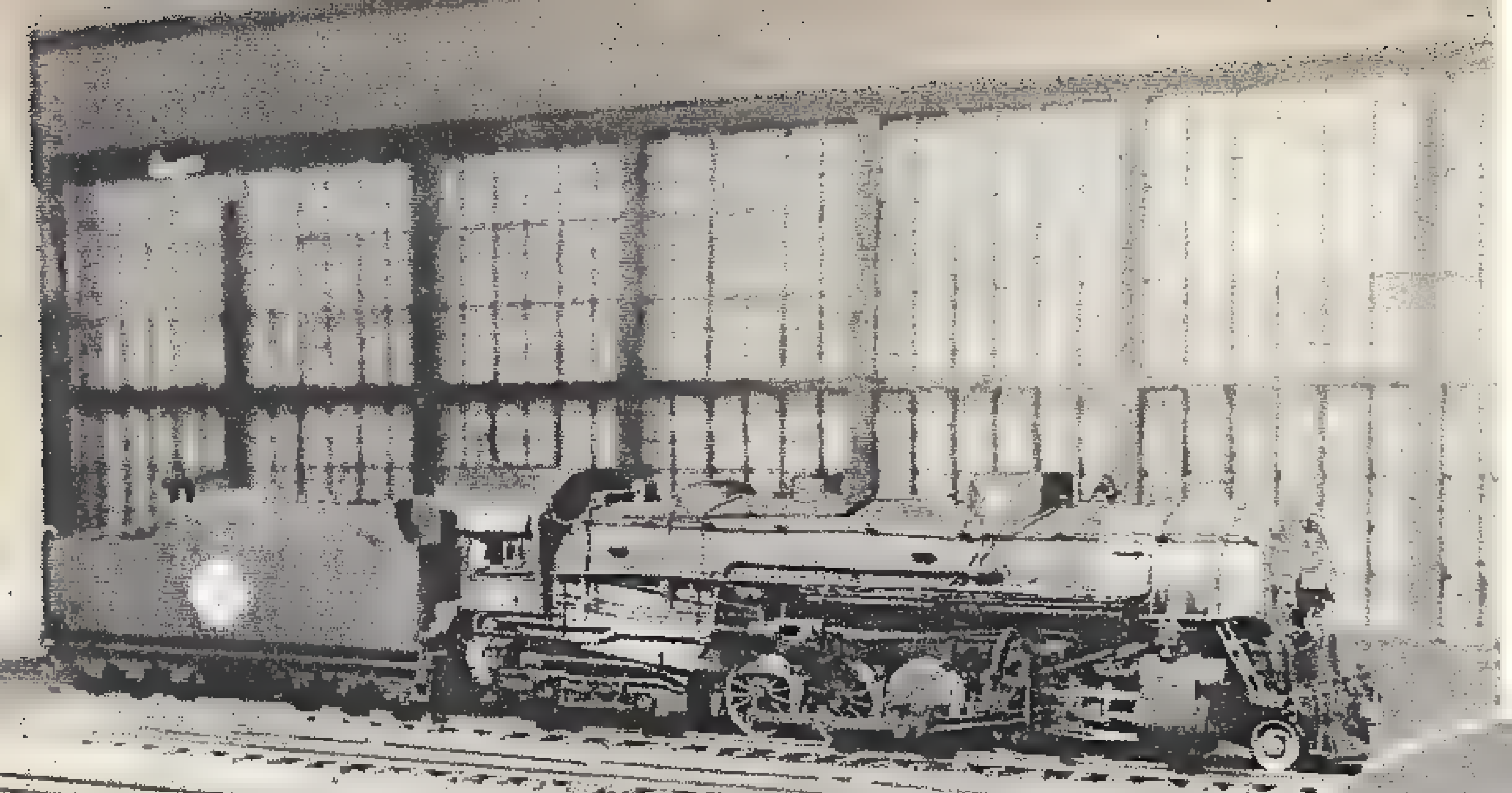
by A. C. Kalmbach

"PLAYING with trains," is what people used to call it, and playing with trains is what some people still call it until they see a real model railroad system and realize the study and planning, the vast amount of detailed mechanical and electrical work, and the craftsmanship that are necessary to build it.

For model railroading is no child's play, but a full fledged hobby, worthy of the best spare time efforts of the 25,000 or so Americans engaged in it. Perhaps it's the very challenge to their abilities that makes this pastime so popular. A model railroad is never finished, and the better the builder's work becomes the further his ambitions surge ahead of his accomplishments. Machinists, electricians, and engineers are not the only ones who tackle the problem of reproducing to exact scale railroad equipment and railroad operations. By far the largest part of these 25,000 model railroaders are bankers, lawyers, executives, office men, and clerks who never met a hand drill face to face before. To them soldering was a mystery, scaling plans something to be left to the draftsman and architect, and the railroad merely a way of getting somewhere quickly.

Model railroading was popular in England even before the war, and while a few Americans had built scale models of one kind or another before that time, it was not until 1927 that the idea of building really comprehensive miniature systems to exact scale was at all practiced in this country. The beginning was in the east, around New York City, and the earliest builders modeled mostly Pennsylvania equipment (until you are a model railroader you never fully realize the individualities of the various large railroads), and to this day Pennsylvania equipment is most used as a prototype.

At first this scale railroading was largely a rich man's hobby. It took either lots of time, or lots of money to buy someone else's



A large freight engine modeled in 0-gauge by William Lenoir, of West Chicago, Ill., is shown at the left. Notice the complete piping detail. The headlight has transparent number plates on each side of the casing. Circle—A realistic railroad scene is presented by these models as they pass each other on a curve.

time. Most of us were too busy making money in 1927-1929 to spend it on hobbies. Then came the depression and a vast increase in leisure time. The fascination of the railroad combined with the allure of the home workshop. One model railroad in a neighborhood started others and the hobby grew like guinea pigs. Since 1934 the growth has been rapid.

The cost limits of a model railroad system are practically indeterminate. A system can be built for a dollar a month. It takes careful planning and lots of work. Systems have been built costing up to $50,000—and there's still plenty of work left on the $50,000 system to add interest and keep the owner busy in his spare time. The total spent in the U. S. on model railroad parts and on completed models is somewhat more than $300,000 a year.

Some of the men early in the hobby, casting about for fresh business opportunities during the depression, started companies which supply plans, castings, machined parts, and now can sell you freight and passenger cars, locomotives, and track in any form, from rough materials to completely finished units that need only installation. The hobby kit is most popular. In this kit the various parts of a locomotive or car are partly finished, so that work left to be done consists only of drilling, tapping, and soldering. The assembly can be accomplished on the kitchen table.

Finished models cost from $45 up for locomotives, from $5 up for cars. The materials for track cost from six cents a foot up. Persons able to afford it often buy much of their material finished and yet lose little if any of the fun, for there is still plenty to do, planning right-of-way, building scenery, arranging schedules of service, signalling, etc.

A model railroad is never finished. It's a lifetime hobby. The man with little money for non-essentials buys as little outside as he can. Rail, spikes, and rail connectors are his track materials. He makes his own ties. Castings for a few parts, wheels, couplers, gears, and motors are about his only purchased materials for rolling stock. Very often he turns out finer work than the best professionals, just because he can afford to put plenty of time into his work, and because he takes pride in his craftsmanship. It's the construction angle that intrigues him.

Roughly 90 per cent of the model railroaders are in the kit class, buying their equipment in the shape of finished or semi-finished parts. The remainder are about equally divided between those who buy finished models and those who build from the ground up, buying nothing but the raw materials. These last are the real craftsmen of the hobby. For them one train is an accomplishment, a product of years of labor. Two hundred hours on a locomotive is not unusual. Because of this, they seldom have as complete systems as the men who buy at least some of the parts.

Imagination is important, perhaps paramount, in model railroading. Suppose you want to start a model railroad. You survey the attic, basement, or perhaps back yard with an eye to the possibilities for a railroad route that will move traffic from one place to another, or at least have that appearance. You select a name for your "pike," elect yourself president, chief engineer, and man of all work. You write for catalogs of perhaps a dozen supply houses to get an idea of what each can offer both as to prices, railroad prototype, and quality. You read the model magazines (there are three, one of which is devoted exclusively to model railroading) and see what others are doing so that you

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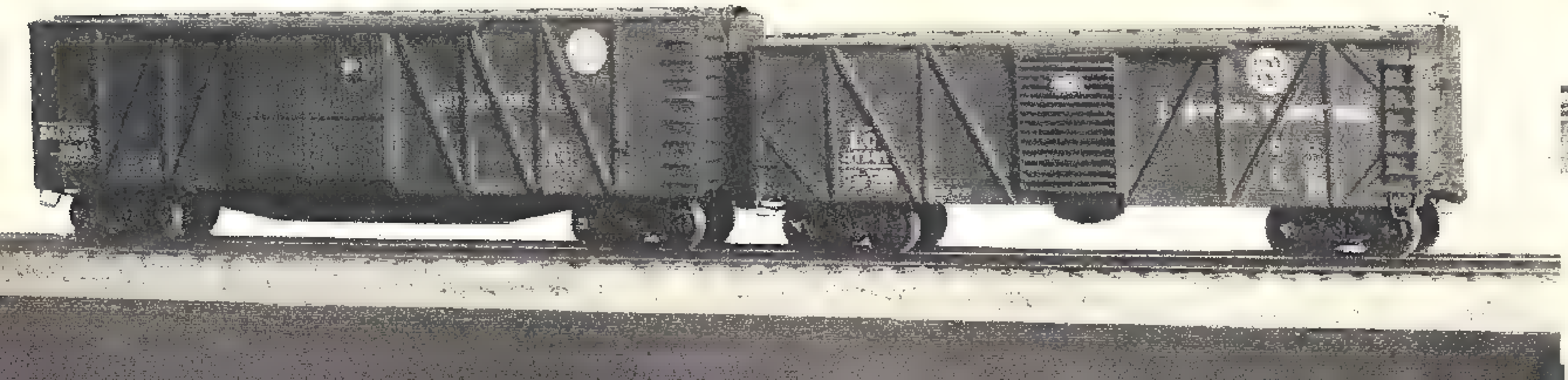
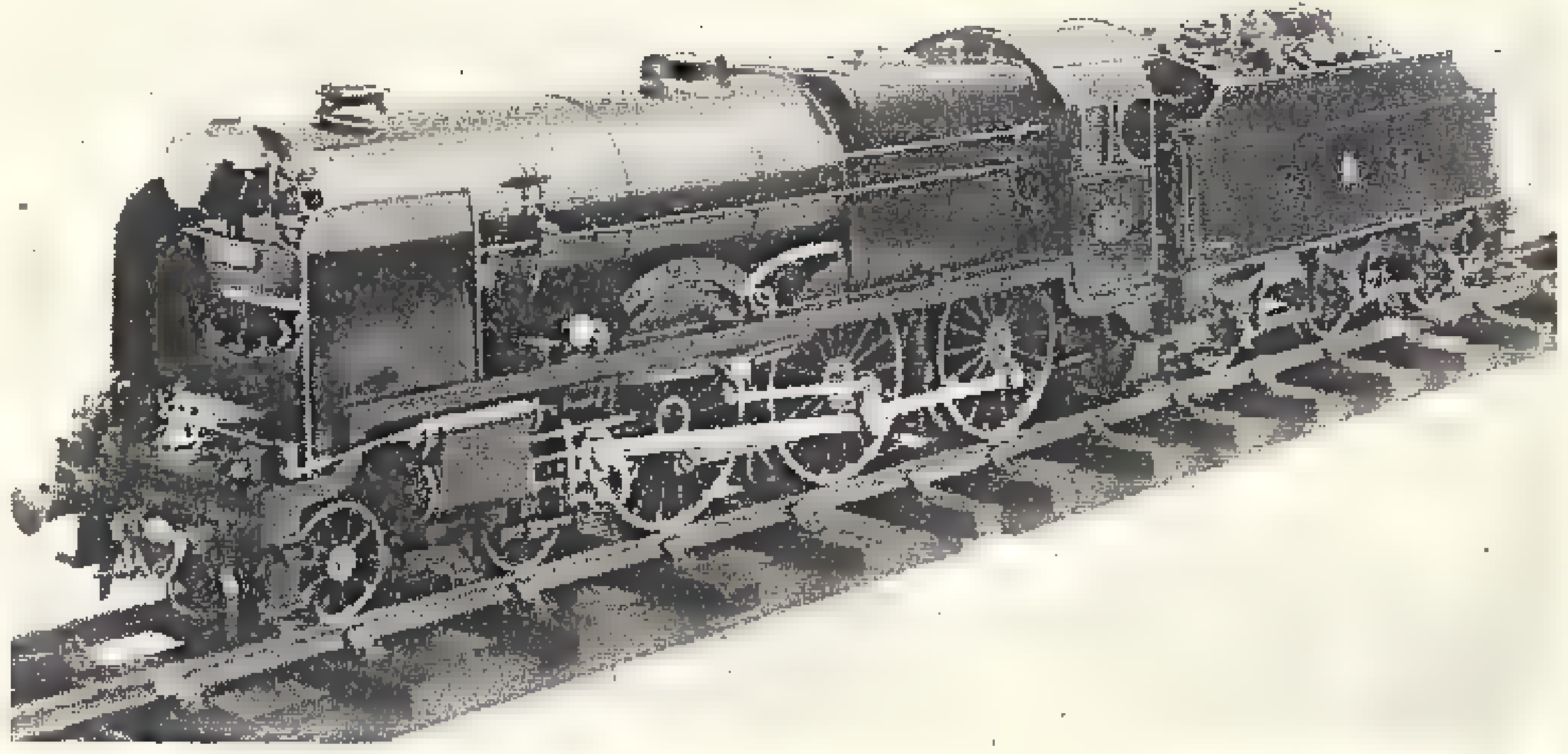
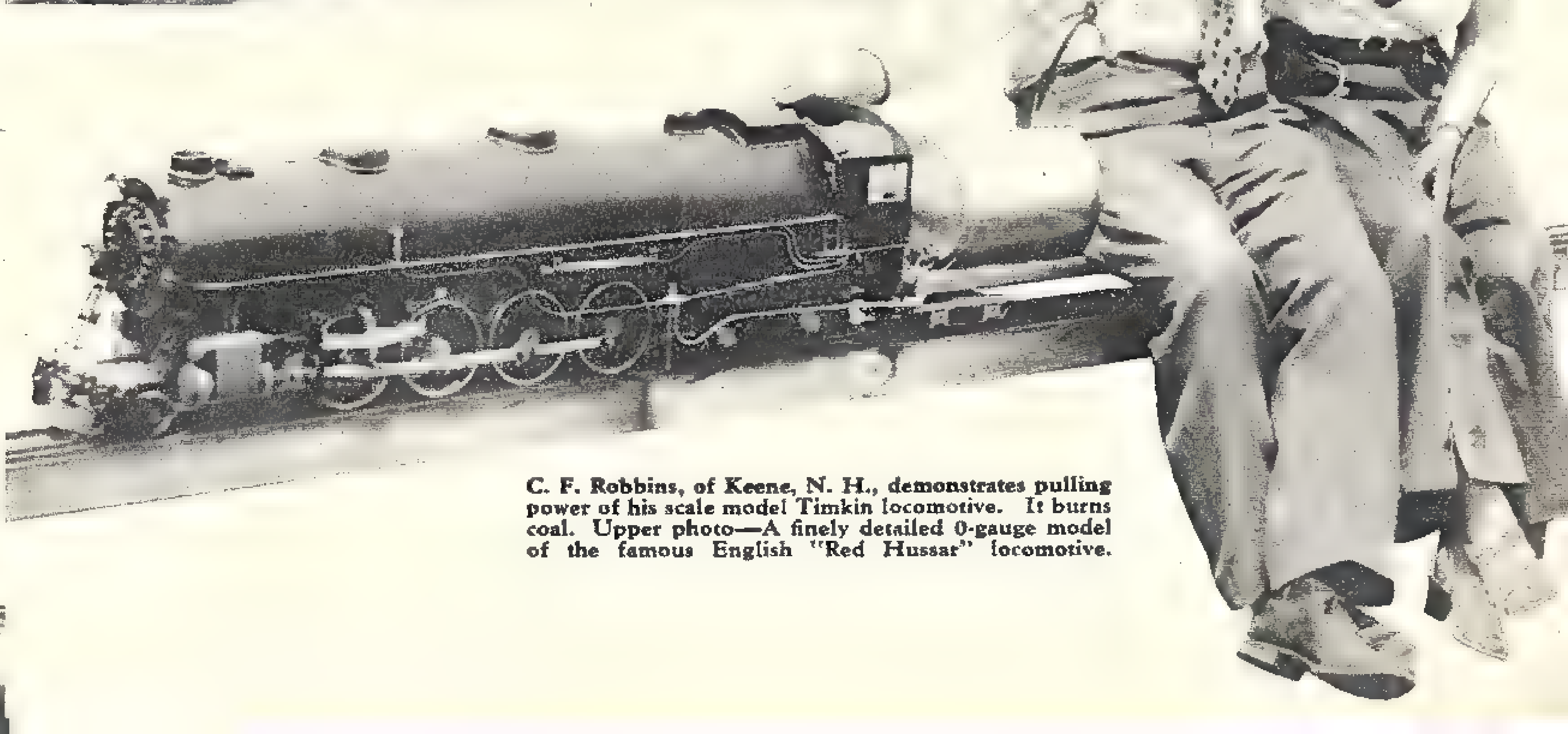
Two box cars built by John Borges, of Boston, Mass., are shown below. Perfect replicas of freight cars, they are for HO-gauge, the smallest size used.



Live steam for model locomotives has its fascination although most miniature systems are electrically powered. The train shown in the photo at right is owned by A. R. Horner, Ahwahnee, Calif. Puffing, it valiantly tackles a steep grade.





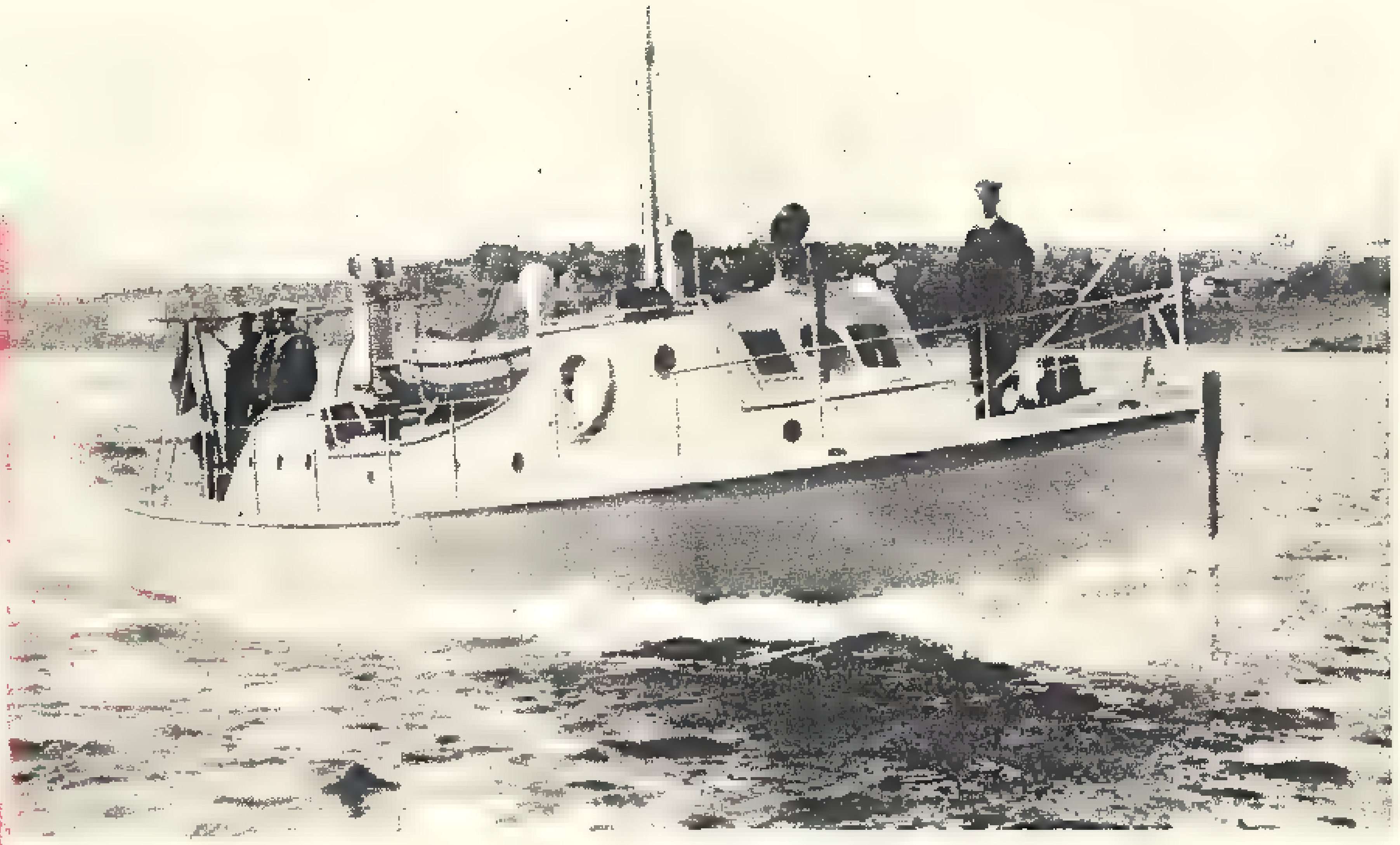
C. F. Robbins, of Keene, N. H., demonstrates pulling power of his scale model Timkin locomotive. It burns coal. Upper photo—A finely detailed 0-gauge model of the famous English "Red Hussar" locomotive.

MECHANIZING The Mounties

by J. R. Robinson

"Get Your Man The Quickest Way," Now Canadian Police Creed.

The new Justice Building (above) in Ottawa, Canada, housing the Department of Justice, is also headquarters of the Royal Canadian Mounted Police. From here orders are issued that activate Mounties in solitary outposts in the furthermost reaches of the Canadian woodlands. Major Gen. Sir James MacBrien, commissioner of Royal Canadian Mounted Police (left) introduced airplanes into the service when he became chief over six years ago.



The modernized R. C. M. P. has 19 speedy power boats, of the type shown above, to combat smugglers. Right—Sketch showing the Mountie as popularly portrayed in fiction. Today, only 300 of 3,000 men are horse-mounted, although all must know how to ride.

"ARE you able to drive an automobile? Can you use a typewriter? Are you qualified in shorthand?"

Hollywood won't like it known, but those three questions are from the latest recruit examination papers of the Royal Canadian Mounted Police. The days of Reading, 'Riting and Riding, the three R's of the old "Northwest Mounted" are past forever. Hum of R.C.M.P. motors and chatter of R.C.M.P. keys drown out the last clatter of hooves. Not stable fatigues but classes in practical mechanics blight young policemen's hopes of high adventure. The Mounties have gone modern.

Plain figures plainly set down best show what has happened to the riders of the plains and their traditional means of locomotion since the days when a horse for every man and a few spare mounts for luck was the rule of the service. Today, there are in the Royal Canadian Mounted Police 2,500 men, 387 sleigh dogs and 300 horses. The list of R.C.M.P. mechanical transport includes 442 cars, 28 motorcycles, 19 trucks, 19 power boats and one Arctic supply ship. In addition the force uses, in its preventive service on the coasts, a small fleet of Royal Canadian Air Force seaplanes.

Mileages for the last year of record mark even more clearly the eclipse of the horse in the Royal Canadian Mounted Police. The distance traveled on duty in the year was 13,506,632 miles; an average of 5,402 duty miles for every member of the force. Nearly seven million miles of the total was covered by motor, just over six million by railway and steamboat, more than 300,000 miles by coast, lake and river patrol boats, close to 200,000 miles by airplane, 50,000 miles by dog team and not enough miles on horseback to be worth recording.

The force has come a long day's ride since the spring morning in 1874 when 300 redcoated, white-helmeted young horsemen started west from old Fort Garry to carry out the words of the newly created "Mounted." The 300 had enough to do in their day. They had to deal with liquor smugglers, cattle rustlers and horse thieves along 800 miles of boundary, to convince 20,000 short-

Air patrols, made in seaplanes of the Royal Canadian Air Force (above), are part of the routine duties of the mechanized R. C. M. P. Mounties travel about 200,000 air miles yearly. *(Royal Canadian Air Force Photo.)*

Motor cars are used by the Mounties in ever increasing numbers. Nearly seven million miles are covered annually by auto patrols using 442 cars owned by the organization. Photo shows, left to right, Constables Greene, Cooper and Ross of the Regina Town Station.

tempered redmen that the new rails going down across the prairie were better not torn up, to mete justice, fight prairie fires, and generally to guard life, property and the Queen's peace over 2,300,000 square miles of Canada's Northwest Territory.

That task was well done. That day is over. Today, the boundaries the R.C.M.P. patrol run west from Atlantic to Pacific and northward from Campobello Island and Cape Flattery to far beyond the Arctic Circle; the lawbreakers they hunt are more likely to be members of international dope rings than simple horse thieves, and their tasks have multiplied with the years. Reporting on the vagaries of the Aurora Borealis, card-indexing fingerprints in an Ottawa office, tracking an Eskimo killer across 300 miles of ice floe, trailing a smuggler to Spain and back, enforcing Dominion wild life laws, rescuing a flight-weary wild goose from small boys, these are all in the mixed bag of a present-day Mounted policeman's duties. In few of the thousand jobs that may come out of the bag is his old friend, the horse, much use to the Canadian Mountie.

Sir James MacBrien, flying commissioner of the Royal Canadian Mounted Police, who, in 30 days made an 11,000-mile inspection of posts, a trip that once required three years of tedious travel by ordinary surface means of transportation, tried, not long ago, to comfort alarmed romantics among his countrymen. The horse, he said, was still assured of a place in the Mounted Police. There was "no intention whatever of dispensing altogether with the mounted men." The intention was only to segregate horses and horsemen in a mounted section to be used for ceremonial parades and in "dealing with unruly crowds." A "mounted section" in the Mounted Police—*Sic transit gloria equi.* But when lawlessness takes to 12-cylinder engines and short wave radio, the law needs more than hooves and horseflesh to keep up with it.

The force itself sees small cause to lament the mechanization of the Mounties. Getting your man being the essential thing, the quickest way of getting there to get him is the best in R.C.M.P. opinion. That's why the Mounties rode horses in the 'seventies. That's why they ride in motors, power boats and airplanes today, when they aren't driving dogteams across the ice hummocks of the last frontier. The Mounties have been going modern from their beginning, and always from within.

Mounted police records of sixty years support the claim. There was, for example, a dangerous innovator named Jarvis. He was superintendent of a prairie division and, as far back as 1886, he was writing headquarters

[*Continued on page* 129]

The figure of the trooper and his horse (right) is fast reaching the point where it can only be seen blazoned on the covers of magazines and in motion pictures. Not enough miles are covered on horseback by modern Mounties to make the matter worth mention in official reports. Plane, car, and speed boat crowd the scene.

The broad brimmed field hats, recognized as the trademark of the Mounties, were adopted in 1896. Before that time, the men wore "pill box" hats of a type shown in photo at left. Above — Motorcycles have extended the modern Mounties patrol range.

SCIENCE Finds New Aids for DEAF

by Josephine Timberlake

Advances in lip reading, perfection of electrical devices lessen hard of hearing terrors.

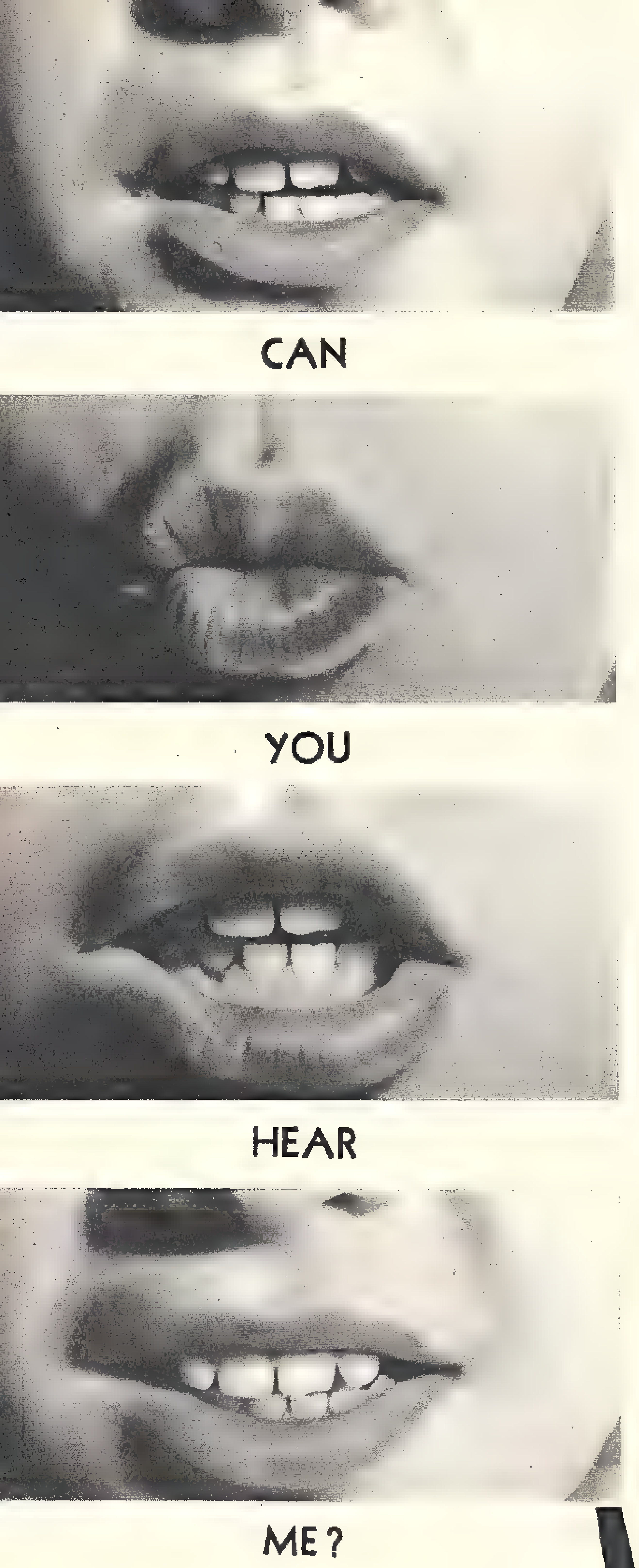
Devices no more conspicuous than spectacles now amplify sounds sufficiently to enable those with partial hearing to carry on conversation and to live normal lives. If only the middle ear is impaired, tiny electrical oscillators behind the ear can carry sound through bone structure to the still healthy inner ear. If the inner and not the middle ear is affected, an air conduction instrument may be helpful. Miss Josephine Timberlake, author of this article and superintendent of the Volta Bureau, is pictured at the right.

"MY BABY was born deaf and dumb," a mother said to me recently, indicating a bright, attractive looking little boy about four years old.

"Oh, no, he wasn't!" I assured her promptly. "He may have been born deaf, but he wasn't born dumb any more than any other baby is. He hasn't learned to talk because he hasn't heard other people talking—just as you haven't learned to talk Russian because you haven't heard people speaking that language. His vocal organs are all right, and his mind is all right, and he can be taught."

Only a few score years ago nobody would have told the mother of a deaf child anything like that. He would have been obliged to grow up not only speechless, but far worse. Because nobody could communicate with him, he would have been considered idiotic. He would not even have learned to read and write. He would not have been allowed to inherit property; he could not have transacted even the simplest business. If his mother had taken him to a doctor, horrible things might have been done to him, for it was thought that his inability to speak was a thing apart from his deafness. His tongue might have been slashed or scraped, or his throat injured, in a misguided effort to give him the use of his vocal organs.

In the 16th and 17th centuries, a few teachers discovered the possibility of educating the deaf, and taught certain isolated cases; and toward the middle of the 18th century groups of deaf children began to have a better chance in life. A French priest, named de l'Epee, and a teacher in Germany, named Samuel Heinicke, established small schools. Heinicke taught his pupils speech and lip reading, the method used by the earlier teachers. De l'Epee tried to do the same, but his school was free, and so many children were brought to him that he was forced to devise a more rapid means of communication. He invented a system of signs to express ideas, and supplemented these by the use of a finger alphabet which had long been in use among monks who had taken vows of silence. His sign language, greatly amplified and improved by his successor, was the forerunner of that which is beloved today by many adult deaf persons in all parts of the world. Its use in schools is frequently



George Cook, a Buffalo, N. Y., instructor in lip reading, illustrates how lips indicate the sounds of various words. Buffalo is one of the centers of lip reading education with a League for the Hard of Hearing often conducting contests in the art which is available there both in public and private schools.
Buffalo Times Photo

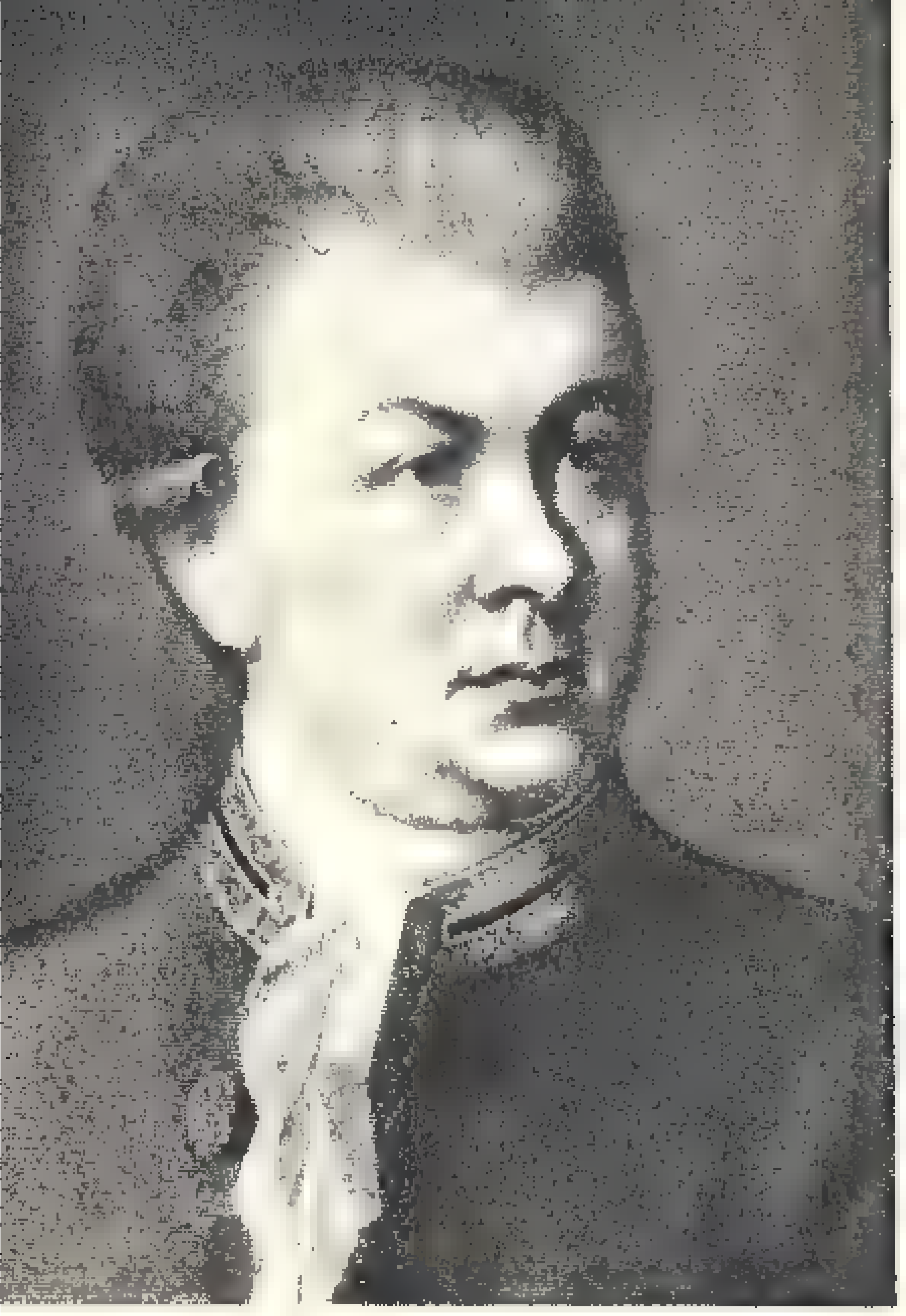
discouraged, because it is a handicap in learning English (or French, or German, or whatever the native language is), but it is an easier means of communication than speech and lip reading, and consequently many of the deaf prefer to use it among themselves.

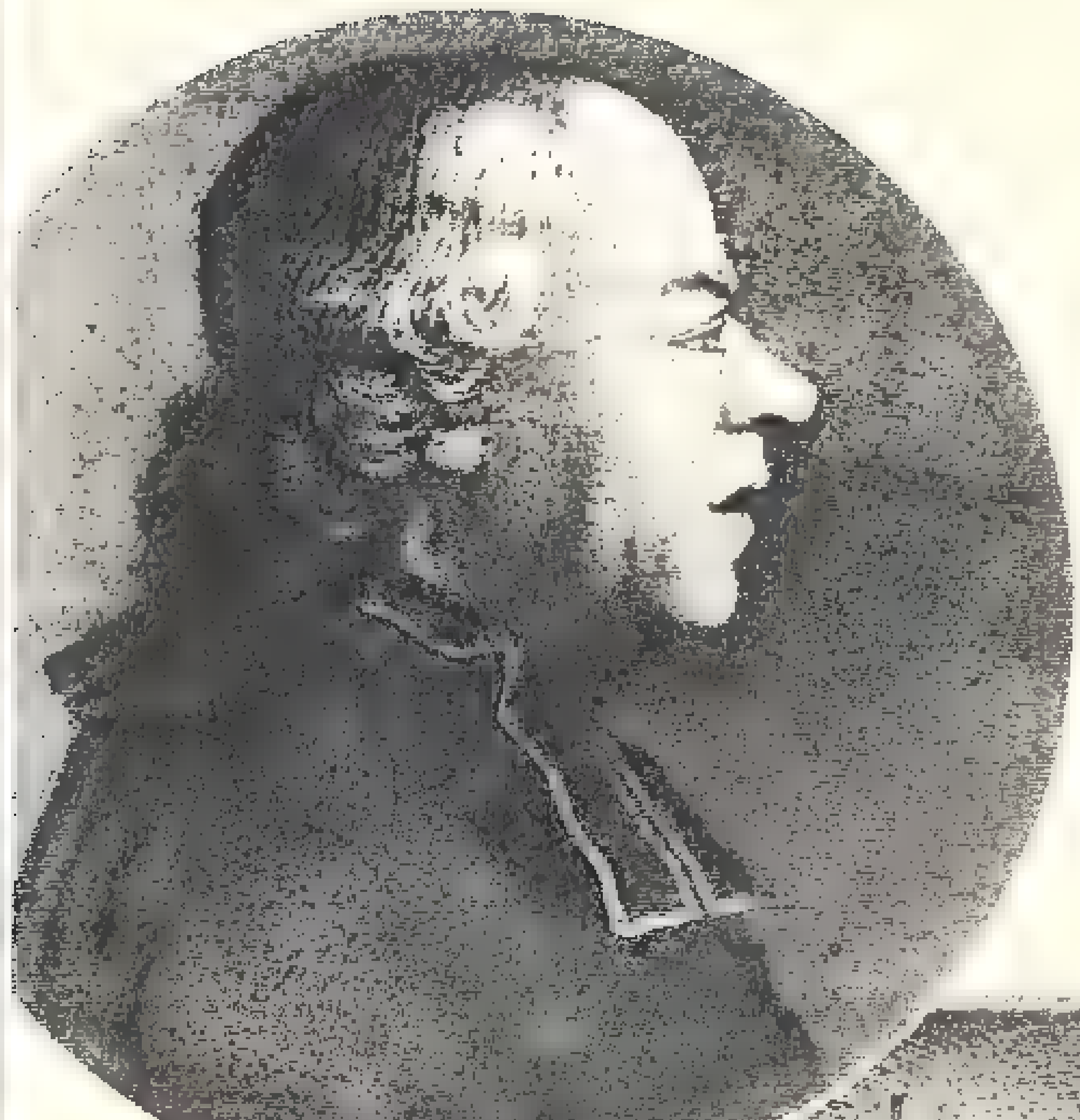
It took a long time for the work begun by these pioneers to spread to other parts of the world, but a permanent school in the United States was established in 1817. It was called "The American Asylum for the Deaf and Dumb," the idea being that the one institution would be adequate to care for all of the deaf in the country. The name of its founder, Thomas Hopkins Gallaudet, appears in mosaics on the walls of the Library of Congress among other pioneers in American education, and the only college for the deaf in the world, Gallaudet College, Washington, D. C., does him honor. It took his school nearly a hundred years to get rid of the objectionable words "aslyum" and "dumb," and the former still clings to the original site, Asylum Avenue, Hartford, Conn.

We have had a little more than one hundred years in which to attain our present stage of development. The realization that more schools would be needed, soon became apparent, and others were established in rapid succession. At first, the children were all taught by means of the sign language and finger spelling. Those who had had speech before the loss of hearing sometimes retained it in part, but they received no training in its use, and it was thought quite impossible for those born deaf to learn to speak at all. This state of affairs continued until after the War Between the States, when some very prominent individuals began to play parts in changing the picture. One was Mrs. Henry Lippitt, wife of the Governor of Rhode Island; another was Mrs. Gardiner Greene Hubbard, whose husband founded the National Geographic Society. Both of these ladies had little girls who were totally deafened by scarlet fever at the age of four or five. Both made up their minds that their children should not be deprived of the speech that was their rightful heritage. All prophecies to the contrary notwithstanding, they succeeded in retaining the speech of their little daughters, and in teaching them to understand others by lip reading, which is watching the movements of the face in speech. An obscure, indomitable little teacher, Harriet Rogers, also was thrust into a conspicuous place when the pupils she had taught speech and lip reading were called to demonstrate her success to the Massachusetts Legislature, so that a charter might be granted for the establishment of a school to teach the deaf speech instead of signs.

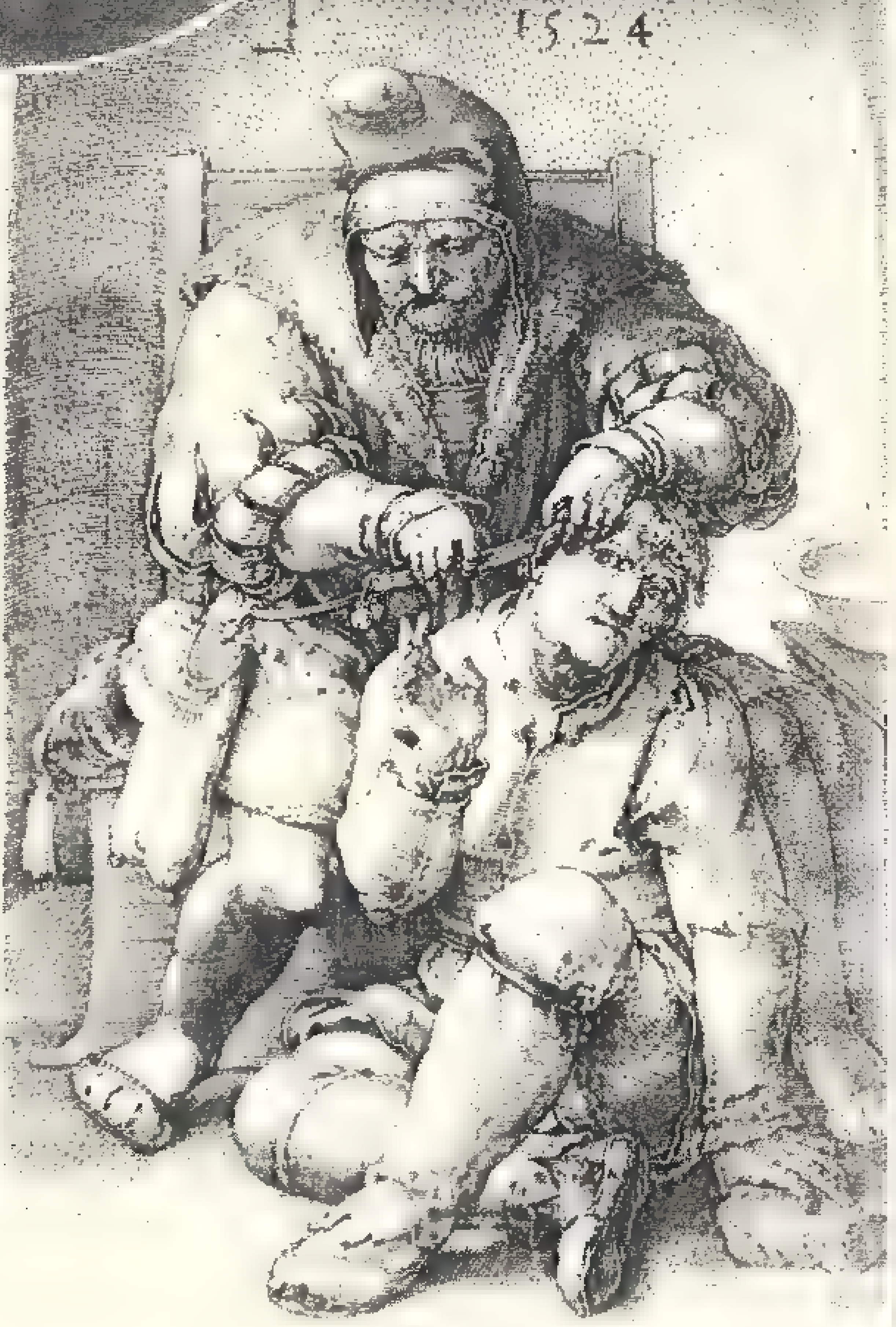
Speech teaching received its real impetus

Though his hearing is impaired, Frank W. Becket, investment banker, is an accomplished pianist and composer. He is shown at work on one of his own compositions, listening to it electrically through the bones of his head. On the piano stands a microphone connected to the tiny electrical receiver worn just behind the ear. Special equipment for the hard of hearing as installed in the Church of the Covenant, Boston, Mass., is shown at the right. Similar devices are being placed in talking picture theaters.





Pioneers in the field of instruction for the deaf were Samuel Heinicke, German teacher, above, and Abbe de l'Epee, French priest shown in circle. Heinicke first taught lip reading. De l'Epee invented a system of signs with which the deaf could express ideas. His system was the forerunner of the one used by many adult deaf today.



Before modern times, the lot of a deaf person was likely to be tragic. Deaf children grew up speechless and often were subjected to barbaric medical treatment. This engraving by Lucas van Leyden from the Bettman collection shows an operation behind the ear as performed in the year 1524.

with the advent of Alexander Graham Bell. Cultured, dignified, enthusiastic, picturesque, the son and grandson of experts in speech-teaching, he acquired early in life an interest in the deaf that amounted to a passion for improving their condition. As long as he lived he replied, when asked his occupation, "I am a teacher of the deaf." His celebrity as the inventor of the telephone and his possession of financial means helped him to arouse much interest in the cause he upheld, and his friendliness and dynamic leadership enabled him to set in motion forces which were to result in great changes for all those handicapped by absent or deficient hearing.

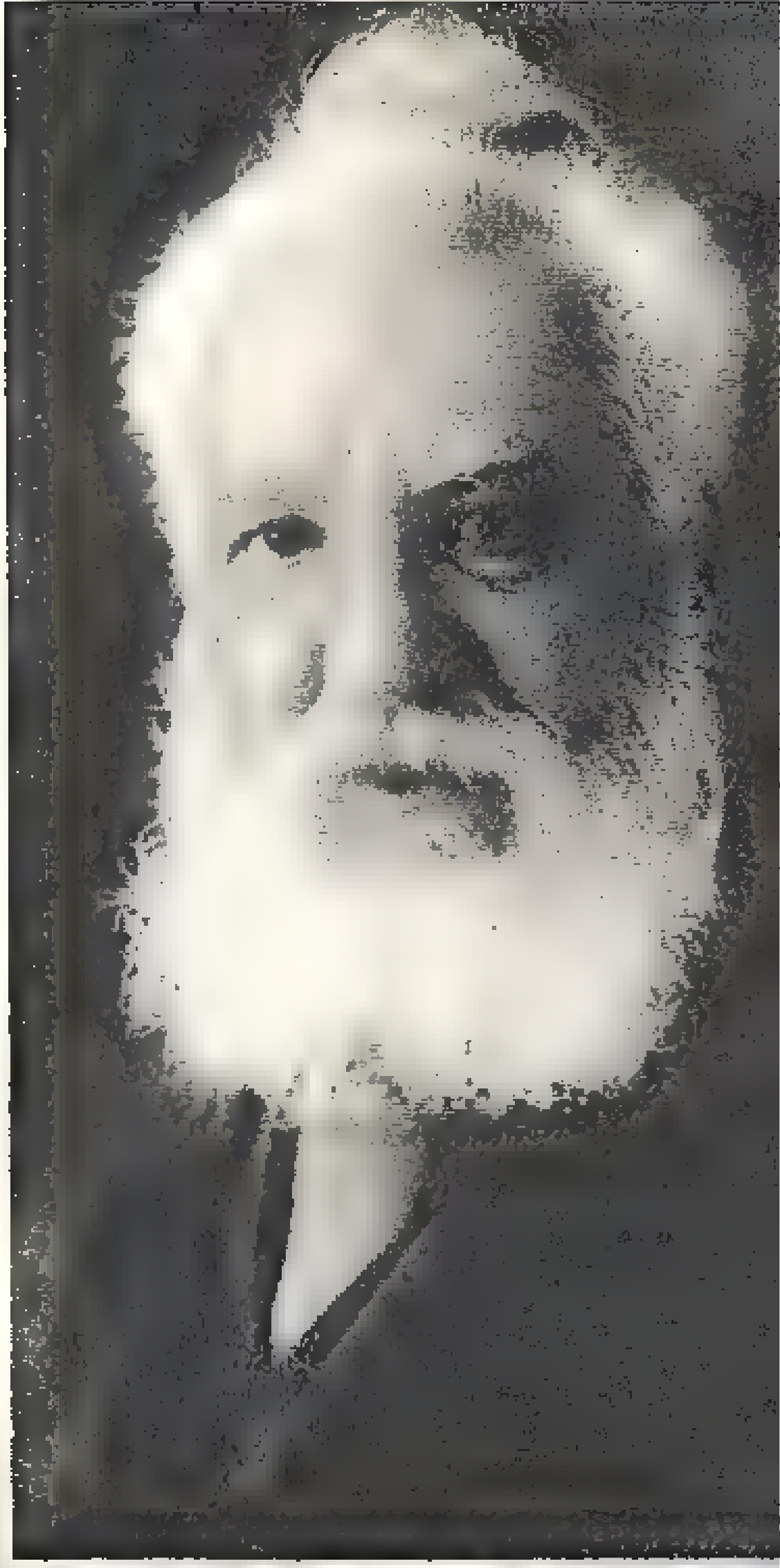
His chief interest was in having the deaf taught speech. He taught them himself, with remarkable success. He gave courses in speech-teaching to their teachers. He lectured and demonstrated in their behalf. Finally, finding himself unable to cope with the immense flood of letters that brought him inquiries of every nature dealing with deafness, he founded and modestly endowed the Volta Bureau "for the increase and diffusion of knowledge relating to the deaf." Later he gave the bureau to an organization which he had founded subsequently, The American Association to Promote the Teaching of Speech to the Deaf. Its service as an information center has become not only nationwide but world-wide, and it is still housed in the building he erected for it in Washington, D. C. Its reference library on deafness is probably the most complete in the world, and its magazine, the *Volta Review,* is the only one in American that deals not only with the education of those deaf from childhood but also with the everyday problems of those who lose their hearing in adult life.

Two other very well known names are connected with the Volta Bureau's history. Sinclair Lewis was employed there at one time, as assistant editor of the *Volta Review;* and Mrs. Calvin Coolidge was a member of the Board of Directors while her husband was vice president of the United States. Mrs. Coolidge, by the way, is still actively interested in the education of the deaf, being president of the Board of Corporators of the school where she once served as teacher—the school for which Harriet B. Rogers fought in her demonstrations before the Massachusetts Legislature—Clarke School, Northampton, Mass.

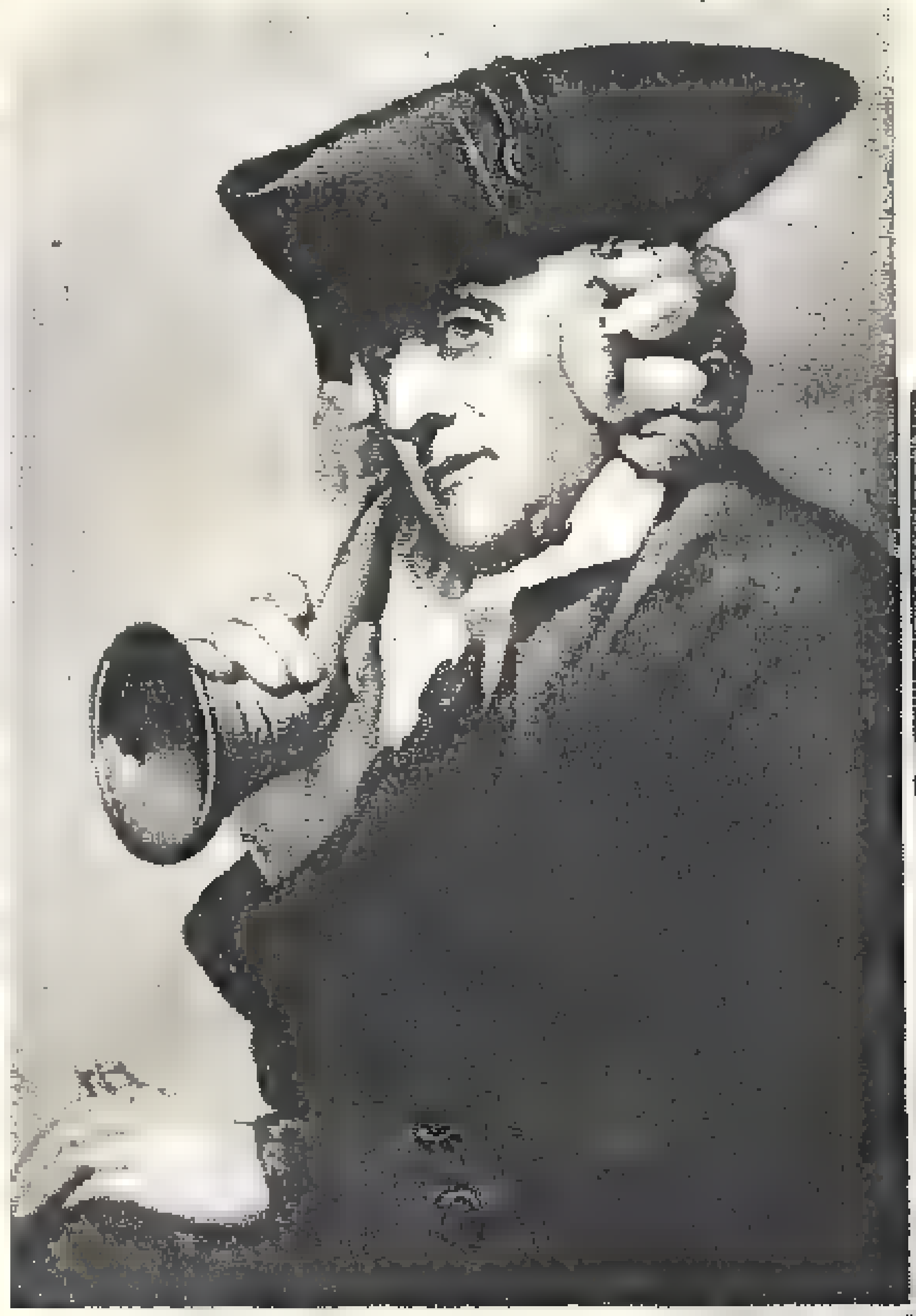
Deafness still brings heartbreak and handicap wherever it attacks, but it is far from being the affliction it was a century ago.

A short time ago I paid a series of visits to schools for the deaf. This is what I saw in one of them. A class of children about ten or eleven years old, gathered around a table on which were placed the outlets for a group hearing aid. The children had come to school five or six years previously, in just the same condition as the pupils who came to the abbe de l'Epee. Not one of them had had any speech. At first they had been taught speech through the senses of sight and touch, and had learned to read the lips of their teachers and fellow students. Hearing tests had

[*Continued on page* 154]



Alexander Graham Bell, inventor of the telephone, was a teacher of the deaf. Interested all of his life in teaching them speech, he founded the Volta Bureau, shown below, in Washington, D. C., and also organized the American Association to Promote the Teaching of Speech to the Deaf. The Volta Bureau takes its name from Count Alessandro Volta, the Italian physicist.

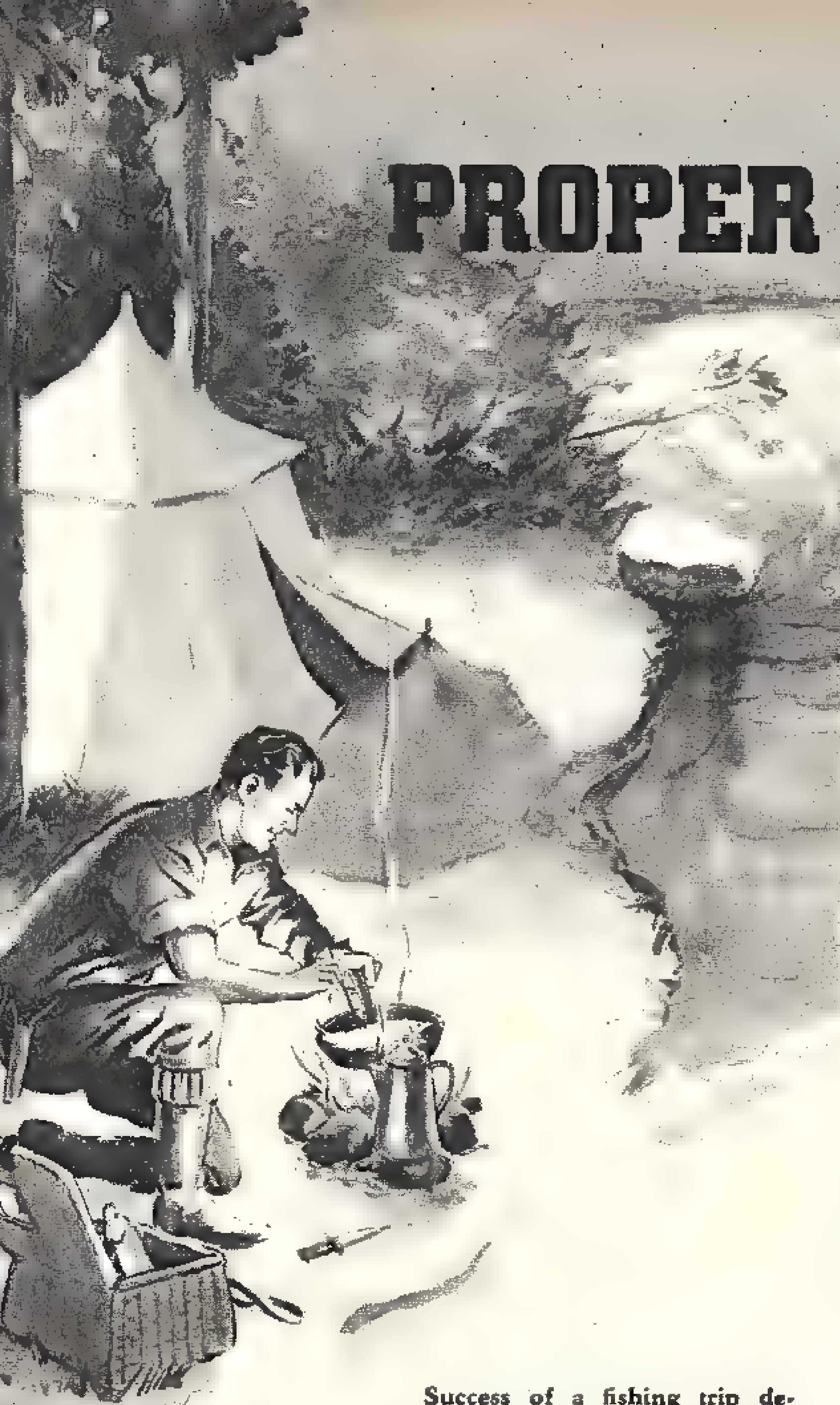


James Hutton, an 18th century physician, is pictured with his ear trumpet. Miss Sophia Alcorn is pictured at the right giving lip reading instruction to a class at the Detroit Day School for the Deaf. Most large cities have similar instruction.

SPORTSMEN'S CAMPFIRE

PROPER ACCESSORIES FOR TROUT FISHING

by Robert Page Lincoln



Success of a fishing trip depends as much on accessories as the scene and the fish. Care in planning brings rewards.

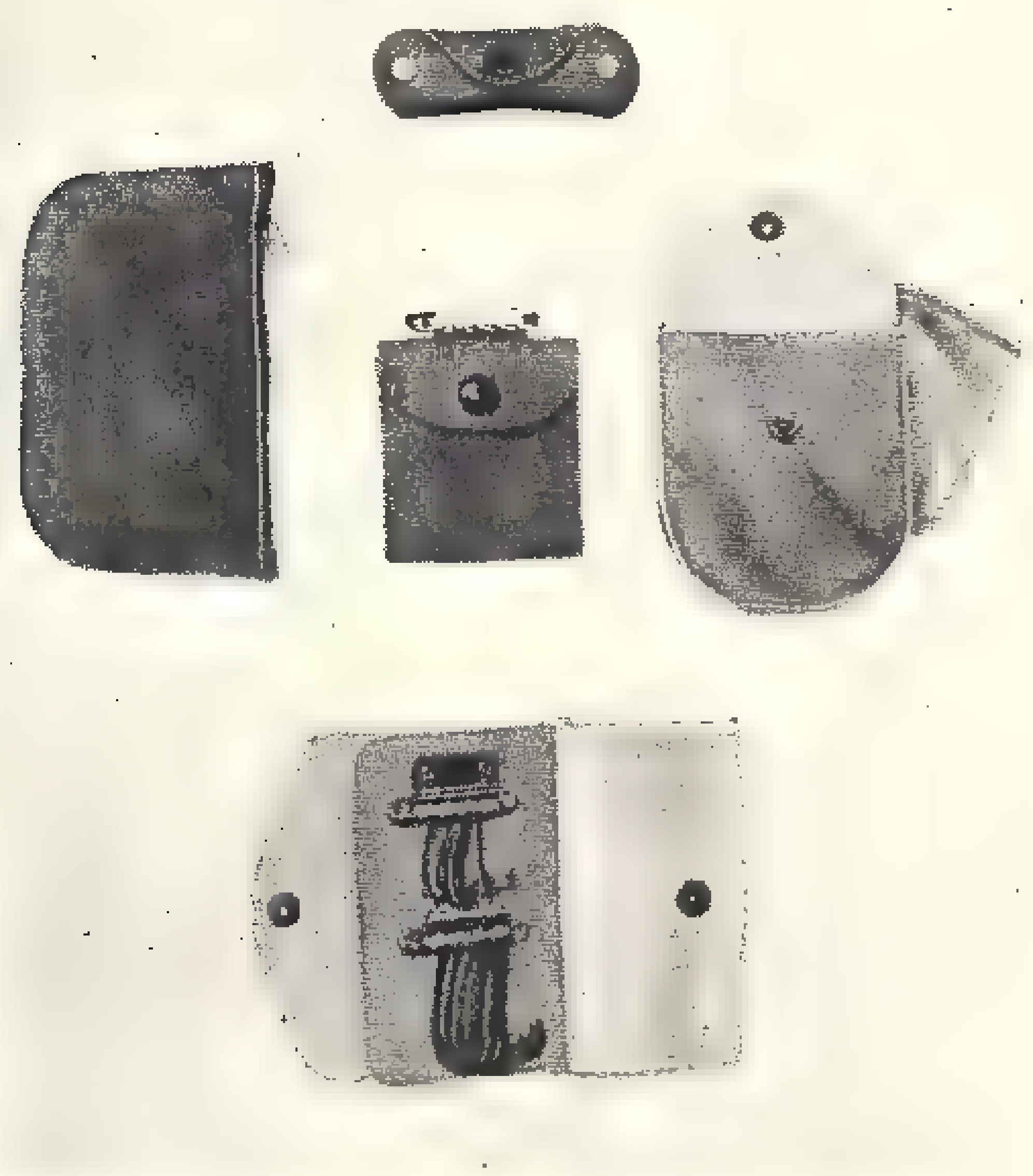
WRITERS on fishing invariably devote themselves in their essays to voluminous accounts regarding tackle habits of the trout, and this, that or the other. When, however, it comes to writing with regard to the clothing and like necessities to use, they pass the subject by merely as an afterthought.

Obviously the success of any trip depends upon the physical well being, proper bodily protection and an ability to master the elements. Instead of being shoved to the back of a book it should occupy first place. That there are colds and all manner of ailments contracted annually on trout fishing and other trips is rather proof that less consideration is given clothing and like particulars than any connected with the pastime. How much better it is to go well equipped to take care of your health and at the same time be able to wade successfully any portion of a river or stream that is reasonably negotiable.

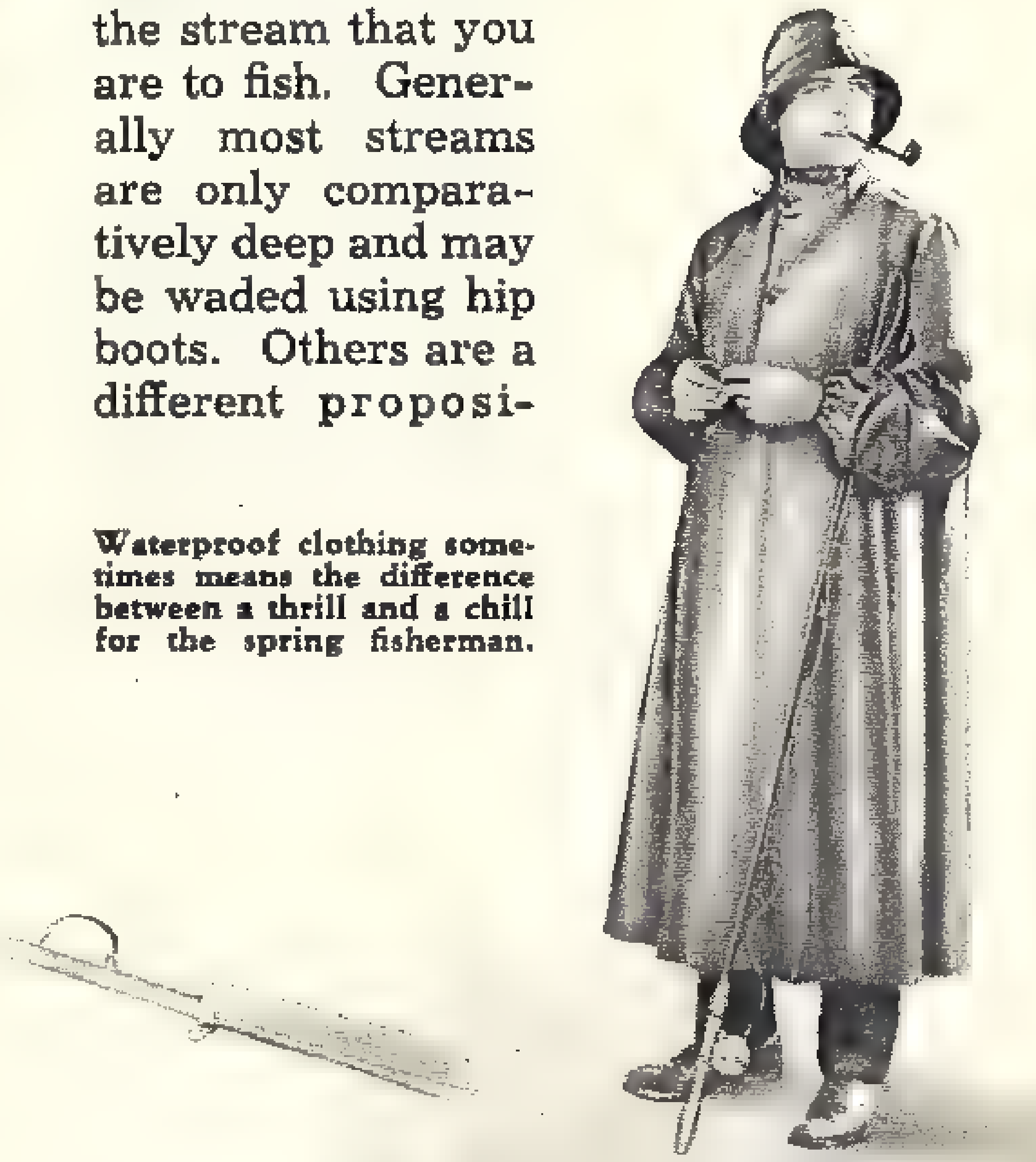
Unlike in other departments of the piscatorial game, trout fishing calls for the use of either hip boots or so-called wading trousers, the same being picked according to the stream that you are to fish. Generally most streams are only comparatively deep and may be waded using hip boots. Others are a different proposition altogether, presenting fairly deep water that would go over the tops of hip boots. In such streams the wading trousers that come up to under the waist are most desirable, in fact are almost a necessity if one is to get the most out of a wading stream. The fisherman who has come upon a stream of the sort using hip boots only to find that time and again it has been impossible to wade across to a certain point; to reach a mid-stream location, or otherwise has found himself halted by reason of boots that would or could not "take" it, knows eventually just how invaluable wading trousers are in a case of the sort. This is not to say that even wading trousers are equal to each and every situation, but it is certain that two-thirds of the streams that cannot be fished when using hip boots will be successfully circumvented by the use of wading trousers.

Wading trousers come in two types, the heavier one with the built-in shoe and the so-called feather-weight or light-weight waders (trousers) which have no built-in shoe on which are worn leather wading shoes or brogues that slip on over the so-called "stockinged" feet of the waders. While there are good points scored for each type of these wading trousers, it can surely be said that the light-weight trousers are the best, where lightness, ease of wearing and transportation are concerned. These light-weight trousers, in the wading class, can be rolled up and tucked away in a packsack to take up but little room. The heavier type, with built-in shoes, are not so easily carried, and are by far more clumsy. On the other hand the heavier trousers with built-in shoes are more substantial and wear longer. Two years is just about the life of a light-weight wading trousers, that is, if used a great deal.

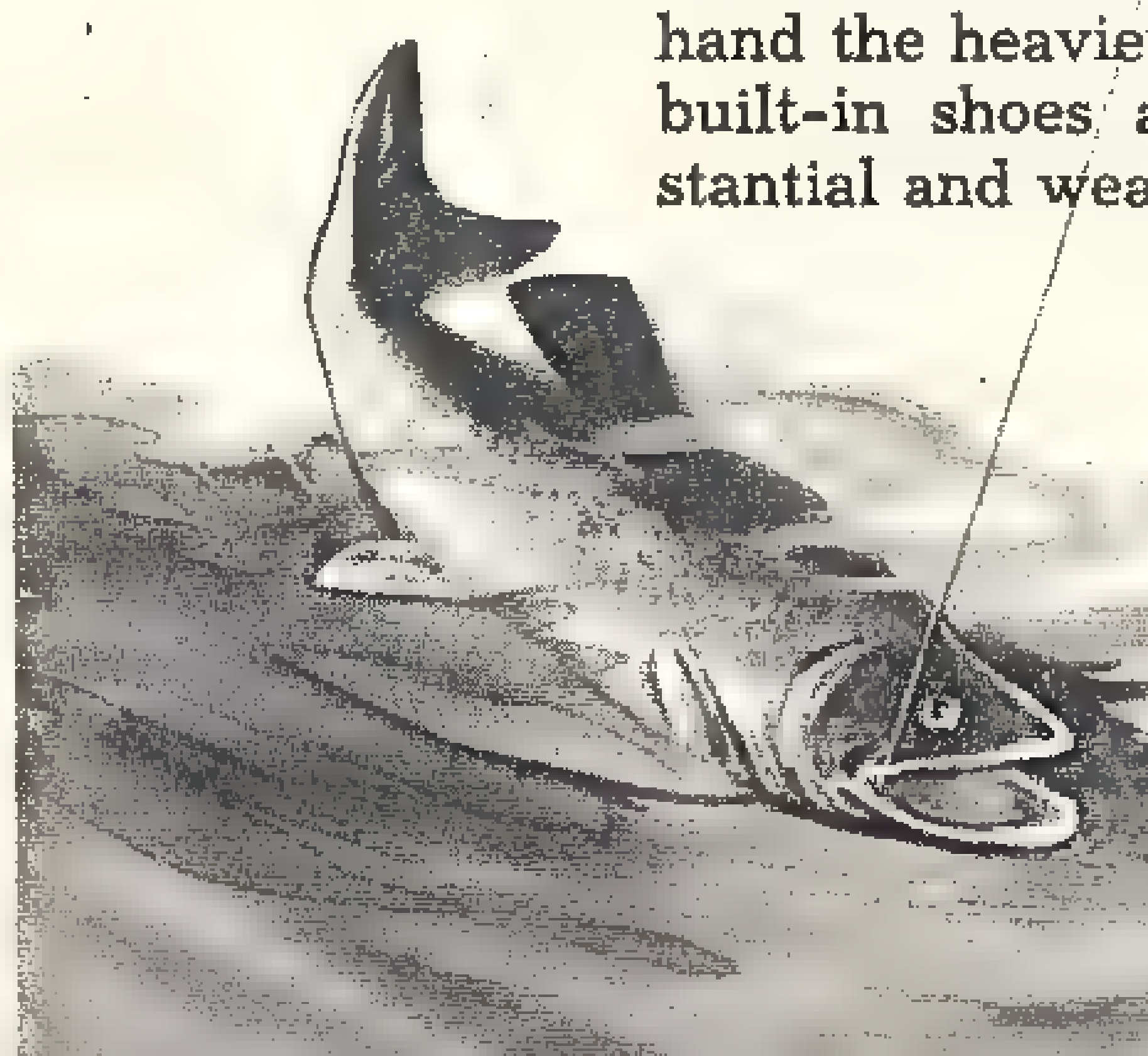
Brogues or shoes used for wading are generally fitted out with heavy soles. If not to be had as the shoes come, a shoemaker can apply these with ease, making them upwards of an inch thick. The bottom of these are set with hobnails, so arranged that they will best grip the rocks on the bottom of the stream. Hobnails, while useful, are not entirely successful in that they will wear



Hook and sinker kits keep the fisherman's weapons in order. At right is a leather rod case.

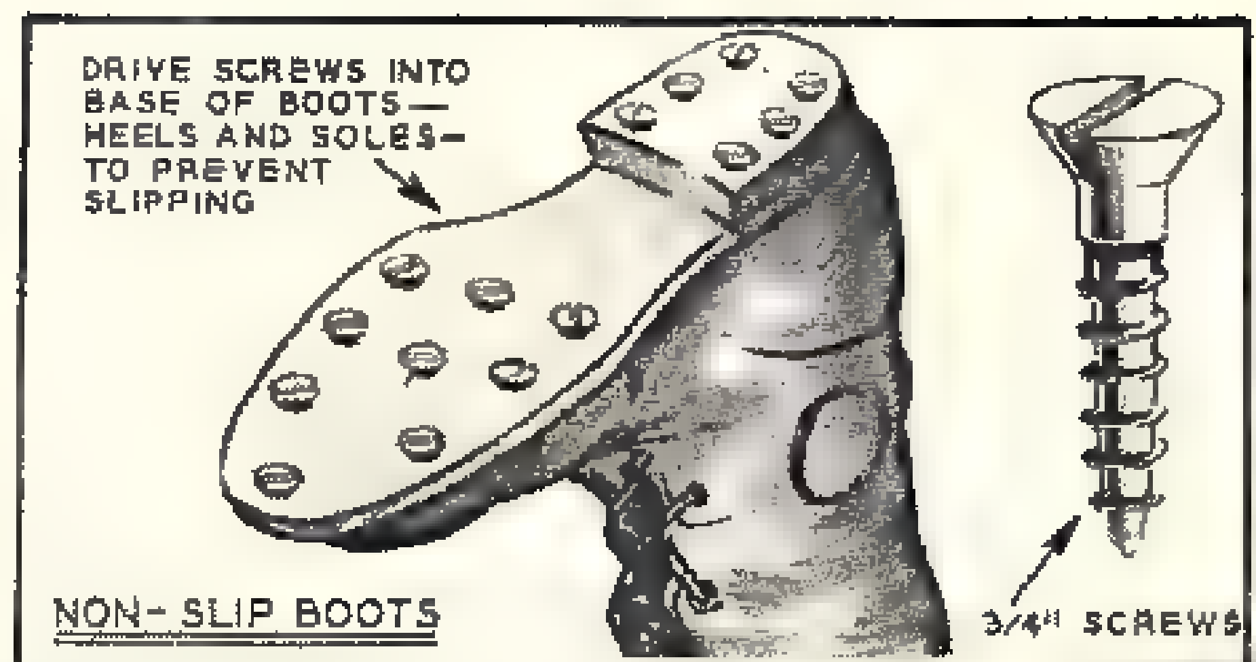


Waterproof clothing sometimes means the difference between a thrill and a chill for the spring fisherman.



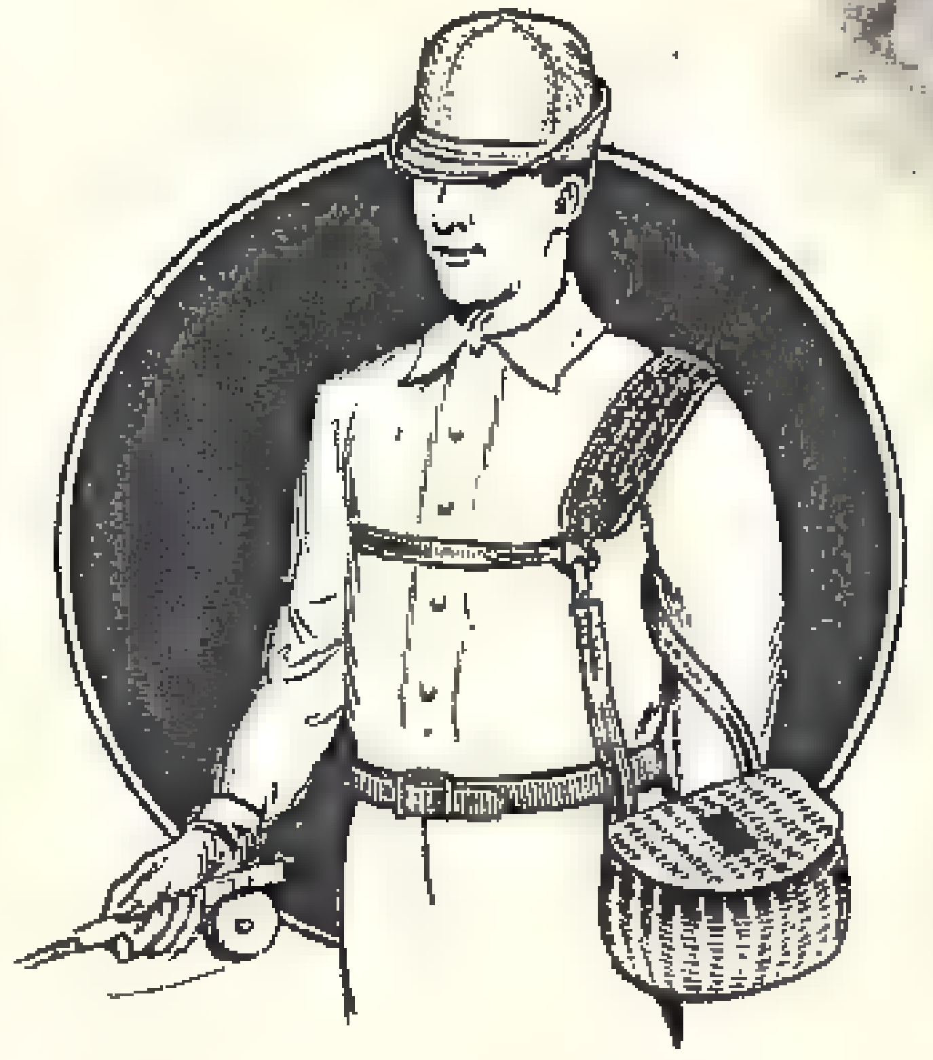
Sheepskin hatbands like the one at the left are a helpful accessory for the fly fisherman. The fly lures are hooked into the band for instant selection.

Light weight ankle boots which terminate below the knee and allow much freedom are popular with many fishermen who like to wade trout streams.


DRIVE SCREWS INTO BASE OF BOOTS—HEELS AND SOLES—TO PREVENT SLIPPING
NON-SLIP BOOTS
3/4" SCREWS

The drawing shows special construction for boot soles to prevent slipping on dangerous rocky stream beds.

Here is a well-equipped fisherman in action. Note creel harness and boots.



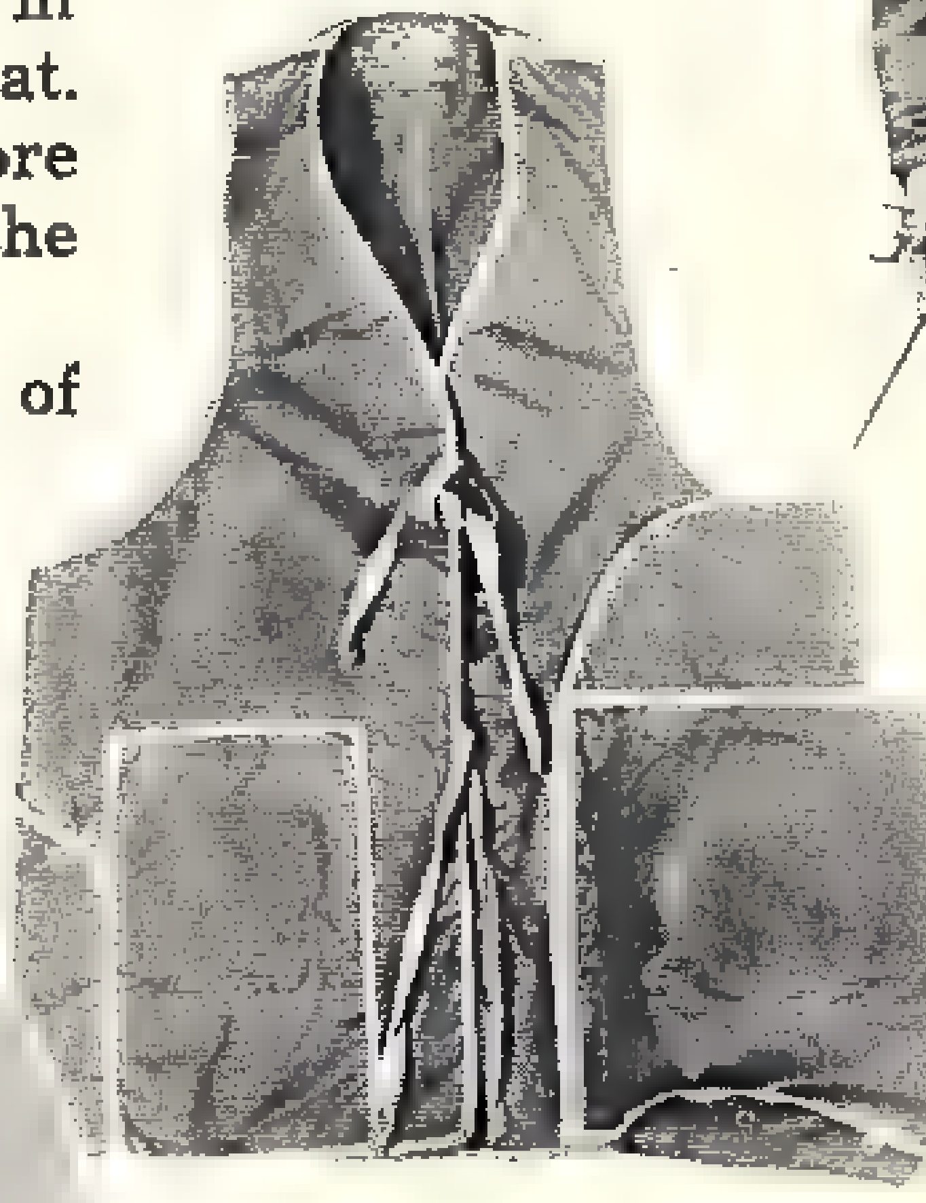
Creels with shoulder harness like the one shown at left permit complete arm freedom while casting line.

down. Even better than the hobnails are three-quarter-inch long wood screws, with sharp edges that are turned in to stand out a quarter of an inch and so arranged over the area of the sole as to make for a good grip on the rocks. These screws should not be so close together that they do not form contact with the slimy cobbles, otherwise the purpose of the idea is quite lost. The sharp edges of the screws cut into the slippery rocks and hold, where the rounded hobnails are likely to slip. If these screws are set in old or worn leather they are likely to be but poorly held in place and are apt to tip over under rough impact. They should be set in new leather soles, which same, being tough and hard, will hold them secure in their up and down position and will not turn when pressure is made against the rocks.

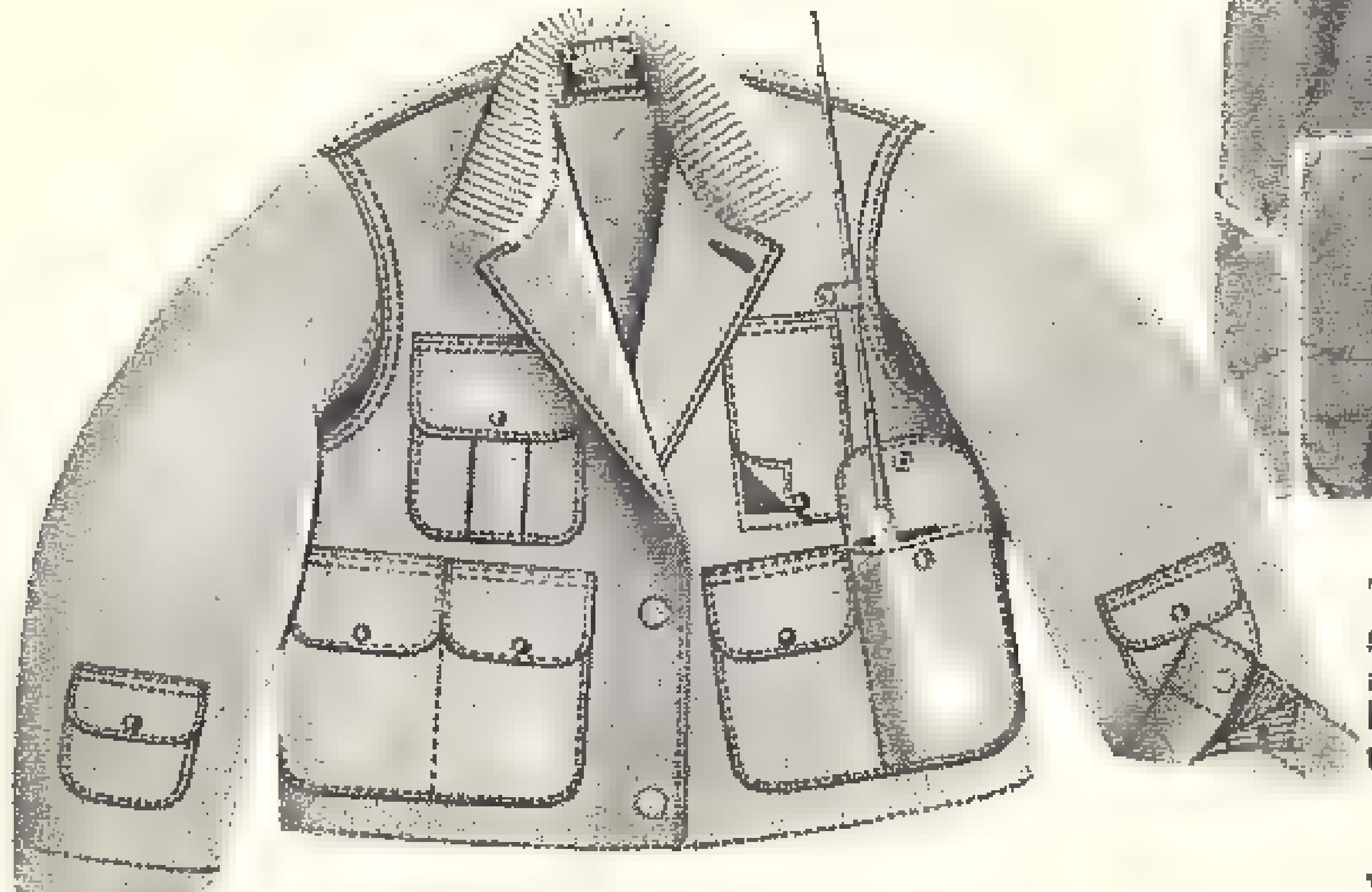
Where wading shoes or brogues are used outside of wading stockings or the featherweight trousers mentioned, there is need of protection for the wading stocking that covers the foot. Therefore, it is necessary to pull on two pairs of wool socks over the stocking after which it is inserted in the wading shoe. This forms a protection between the stocking and the shoe that will prevent wear. Inside of the stocking another two pairs of socks are used, thus involving the use of four pairs of socks. While this will seem a lot of socks, it should be remembered the trout water, whether in the summer or spring is likely to be ice-cold. With the sufficient number of socks stated one will find himself comfortable at all times, and will stand not the slightest chance of incurring a cold. It should be remembered that a clammy foot in a pair of hip-boots will be likely to invite a cold as well as walking barefooted in the water. This is something that is rarely given any attention. Since many colds come from the feet, the protection that must necessarily be accorded them should be as complete as possible.

Wading trousers (or wading stockings as they are also called), have need of strong suspenders to hold them up. They are but fairly tight to the body. Some years ago there was considerable propaganda put out against these wading trousers, the statement being made that they were dangerous. If the fisherman got out into mid-stream and was swept off of his feet, or got into a deep hole, these trousers would fill up with water, and would then pull the fisherman down, resulting in death by drowning. So few, if any, have these drownings been that they are to be dismissed without second thought. The chances of drowning in a pair of wading trousers on 90 per cent of our American trout streams is extremely narrow. Undoubtedly, in fishing a real swift stream, in which one has difficulty in standing on one's feet, there would be some risk, but the same risk would be incurred fishing with hip boots or even when fishing in the "soaking wet" style, where no boots are used, just the hobbed shoes. The fact remains that the wading trousers are well nigh invaluable, and assures one the opportunity of fishing places in streams that otherwise cannot be got at. While these waders cost considerably more than the hip boots they are well worth the added difference.

This Yale hat and similar types protect the head of the fisherman from the weather and are also popular for any other kind of outdoor activity.



This lightweight waterproof vest is designed to protect the sportsman without impeding his movements. The sportsman at the right is wearing a burr-proof and mosquito-proof buff horsehide garment and carrying one of many folding kits on the market that serve well to carry lures, hooks, line, etc.



Lots of pockets in this special waterproof fisherman's wading coat provide room for tackle.

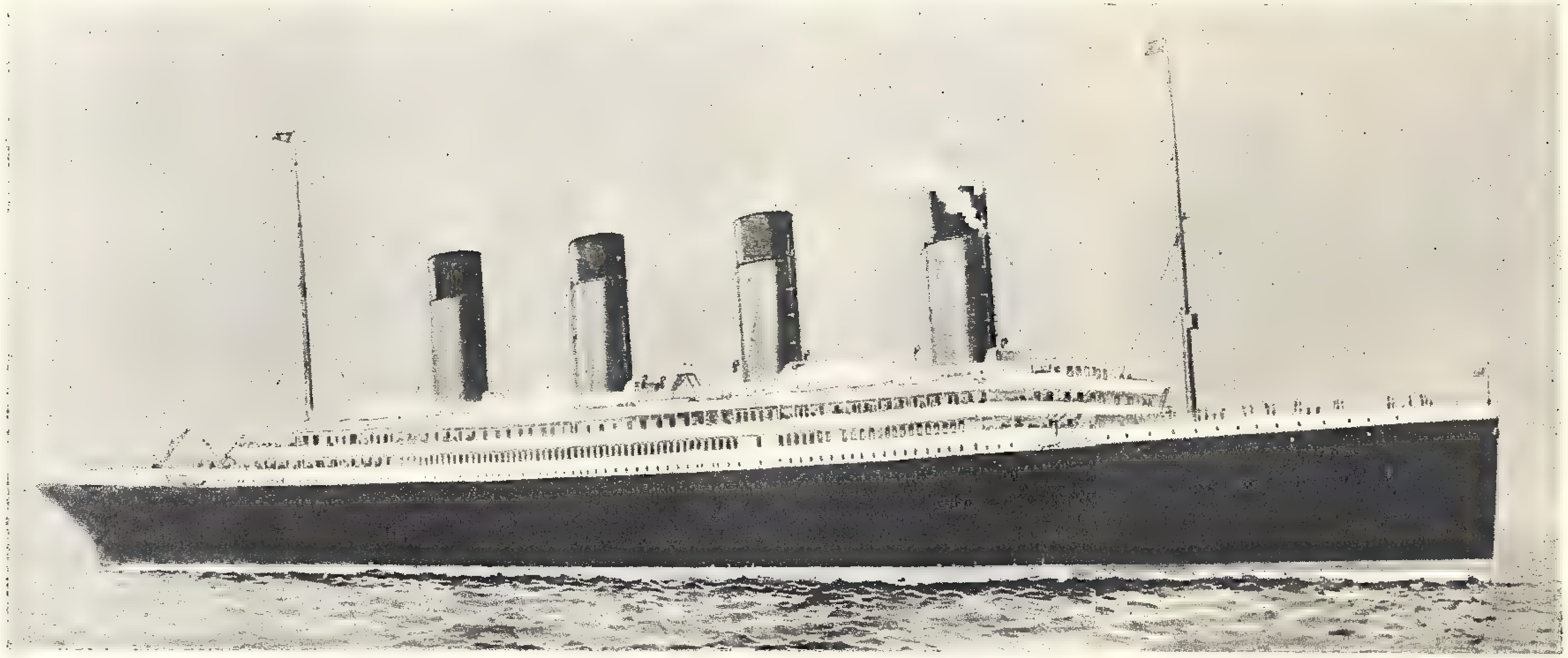
Hip boots accompany about 75 per cent of the trout fishermen on their annual trips, regardless whether they permit one the opportunity of covering all stretches of water or not. The oldtime boot used in trout fishing was little short of a trial when worn. Many of these were in the heavy, ditching boot type. They were hard to wear and invariably wore blisters on the heels, toes and sides of the feet, which were caused by the boot foot being too stiff to bend with the foot. In other words the foot would bend but the boot would not, thus forming a wear of the boot against the foot. Present-day hip boots are now made in a light-weight material, so soft and merging with the movements of the foot as to surprise one. Such boots are extremely easy on the foot, and, worn with a pair of wool socks, possess everything that is needed in wading efficiency. They are so light and are made of such featherweight material that they may be rolled up in a small bundle to take up but little space. New innovations in these rubber boots of the hip variety involve buckles that connect over the instep of the foot, this holding the boot in place on the foot. If pulling the boot out of the mud, it will come up without being left in the same. Fishermen who have had misfortunes of the sort will appreciate the value of this inventive item.

Newer type rubber boots have various non-slip features, the chief invention in this line being a rubber boot with a sole to which you may affix hobnails. This is no less than a stroke of invention wrapped up in one package. Corrugated and cleated soles are interesting additions to boots, also ankle-fit features that make such boots more comfortable on the foot. Other recent additions to the line of boots that are useful not only for the trout fisherman but all fishermen as well, are the so-called ankle boots that reach up some 16 inches or so on the leg. These have no tops like in the hip boots. They terminate below the knees. They are light in weight and incorporate all the features demanded in a short boot. They are used in fishing along brushed-in streams, through

[*Continued on page* 116]

"IFS" of the GREAT "TITANIC" TRAGEDY

From 25 years of study, a radio operator analyzes chain of events which swept an "unsinkable" ship to doom amid ice of North Atlantic.



Greatest ship of her day, the *Titanic* sailed westward 25 years ago this spring into circumstances rivaling Greek tragedy in catastrophic portent. A vessel of 46,328 tons and 882 feet in length she would be one of the biggest ships even today. There were accommodations aboard for 2,650 passengers and a crew of 892.

by Karl Baarslag

Author of "SOS to the Rescue"

ALTHOUGH 25 years have passed, bringing with them many other sea disasters, the foundering of the White Star liner *Titanic* remains to this day the worst marine catastrophe of all time, measured in lives lost. On a spring night, April 15, 1912, 1,517 men, women and children perished in the icy waters over the Grand Banks of the North Atlantic. The material loss was more than $12,000,000. The world's newest, largest and most luxurious "unsinkable" ship went down on her maiden passage in two hours and forty minutes. Lost with her, on board and overboard, were a long list of prominent figures in the arts, in public life and in the business world. Her commander, E. J. Smith, Commodore of the line, went down with his ship, as did 77 per cent of her crew.

The world was stunned following the news. Business virtually ceased on the New York Stock Exchange. Consternation ruled at Lloyd's, who had insured the vessel at one of the lowest rates ever given because of her supposed "unsinkability." Buildings in London, New York, and elsewhere half-staffed their flags. The sinking aroused sensational rumors, wild charges, and acrimonious controversy. It was made the subject of two inquiries, first by the United States Senate, the other by the British Board of Trade, under presidency of Lord Mersey.

The poignancy of the *Titanic* disaster lies in the extraordinary tragic concatenation of circumstances, which, taken separately, would not have resulted in disaster but which, linked together in relentless succession, made the catastrophe inevitable. In no Greek tragedy can one find such an inexorable and fatal chain of calamitous circumstances. Here was no *General Slocum* fire and a panic of helpless women and children; no sudden sinking of a torpedoed *Lusitania* or badly holed *Empress of Ireland;* no helpless and leaking *Vestris* foundering after a severe storm. Just the glancing scratch of an iceberg—and a small berg at that!—on a starlit, calm, clear night.

After the two inquiries, the full tragic chain of "ifs" and "might-have-beens" stood revealed in terrible clearness. If the lookout men had sighted the berg a few seconds earlier the collision would have been averted entirely. Had the berg been sighted a few seconds later, the crash would have occurred more nearly head-on with probably a small loss of life, but with no danger of sinking. The ill-fated liner turned from her course just exactly far enough to receive a glancing, 300-foot long slash, on her starboard side immediately below the waterline.

If the *Titanic* had been built with an inner skin such as the *Mauretania* or other ships had, or, as is the usual practice, with wing bunkers along the side, the wound might have not been fatal. Even with no inner skin and with boiler rooms right across the ship, she could have floated if her bulkhead deck had been watertight, or, as Lord Mersey concluded, "If the transverse bulkhead abaft of No. 4 boiler room had been carried up to D deck, the ship would have remained afloat." Subsequent disclosures proved that this was the *Titanic's* Achilles heel. All the other watertight bulkheads were carried up one deck higher but for some inexplicable reason this bulkhead stopped at E deck. But, even with the forward bulkheads carrying a very low margin of safety, that is, up to E deck or only 11 feet above the water line in smooth water, she still sank slowly enough to permit all her passengers and crew to leave in ample time—if, and this is an incredibly tragic "if"—if there had been enough boats and rafts for those she carried.

Certified to carry 3,547 persons, she had boats for only 1,178, and even this meagre figure was nearly double that required by the antiquated Board of Trade law of 1894, which had not been revised in 18 years. Therein lay the ironic tragedy of the *Titanic*. Perfect weather and ample time for launching boats, such as few sinking ships have ever been

John George Phillips, chief radio operator of the *Titanic*, went down with his ship and the principal credit for the saving of the 712 persons rescued. There are monuments to him in both England and the United States.

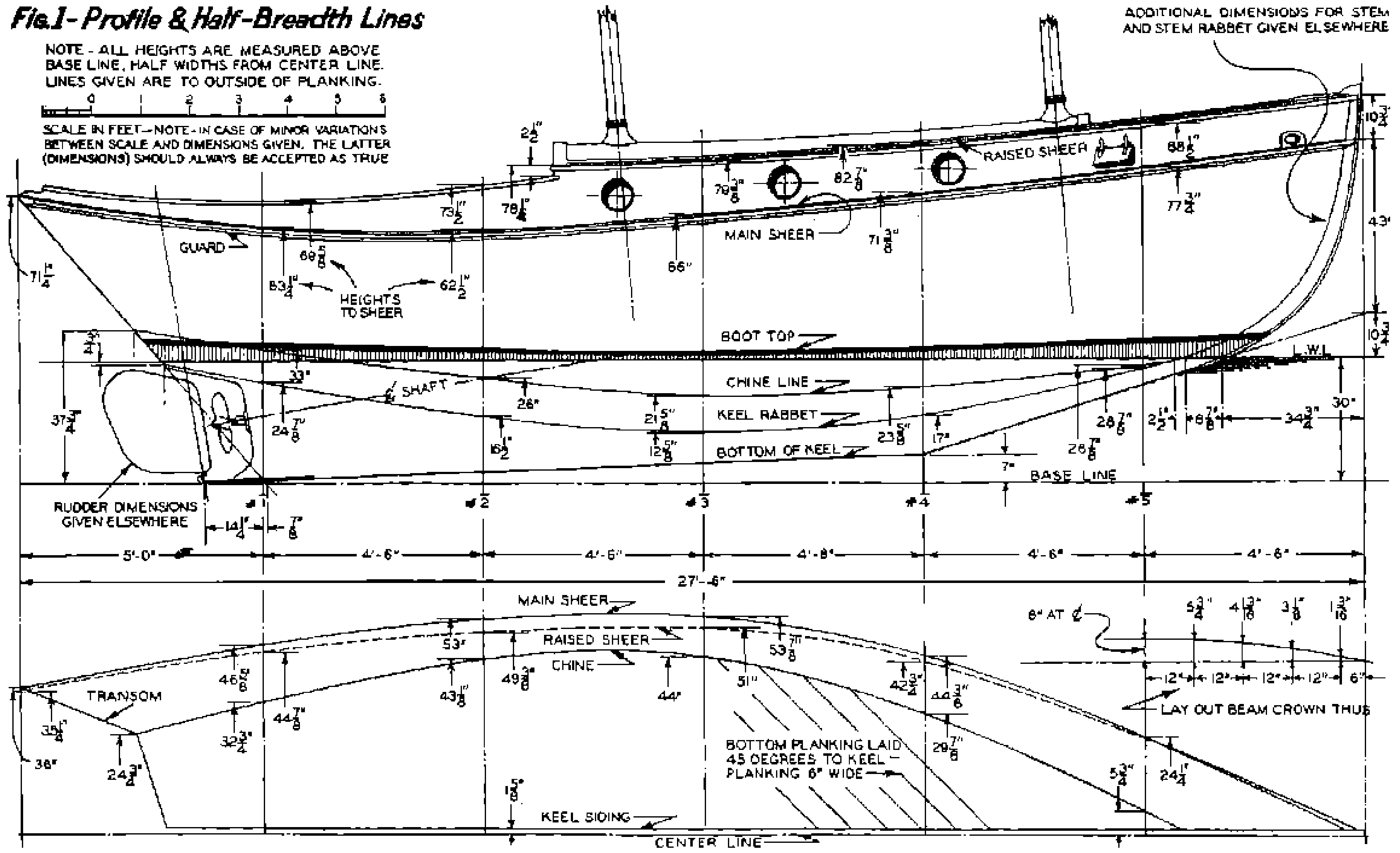


Fig.1- Profile & Half-Breadth Lines

NOTE - ALL HEIGHTS ARE MEASURED ABOVE BASE LINE, HALF WIDTHS FROM CENTER LINE. LINES GIVEN ARE TO OUTSIDE OF PLANKING.

SCALE IN FEET—NOTE - IN CASE OF MINOR VARIATIONS BETWEEN SCALE AND DIMENSIONS GIVEN. THE LATTER (DIMENSIONS) SHOULD ALWAYS BE ACCEPTED AS TRUE

ADDITIONAL DIMENSIONS FOR STEM AND STEM RABBET GIVEN ELSEWHERE

0
1
2
3
4
5
6
RAISED SHEER
MAIN SHEER
GUARD
HEIGHTS TO SHEER
BOOT TOP
CHINE LINE
KEEL RABBET
BOTTOM OF KEEL
SHAFT
L.W.L.
BASE LINE
RUDDER DIMENSIONS GIVEN ELSEWHERE
5'-0"
4'-6"
4'-8"
27'-6"
MAIN SHEER
RAISED SHEER
CHINE
TRANSOM
BOTTOM PLANKING LAID 45 DEGREES TO KEEL— PLANKING 6" WIDE
KEEL SIDING
CENTER LINE
6" AT ℄
LAY OUT BEAM CROWN THUS

Here are given the profile and half-breadth lines for Flying Cloud. Make certain that you follow dimensions given.

"Flying Cloud"

Designed Especially For Modern Mechanix

by Sam Rabl

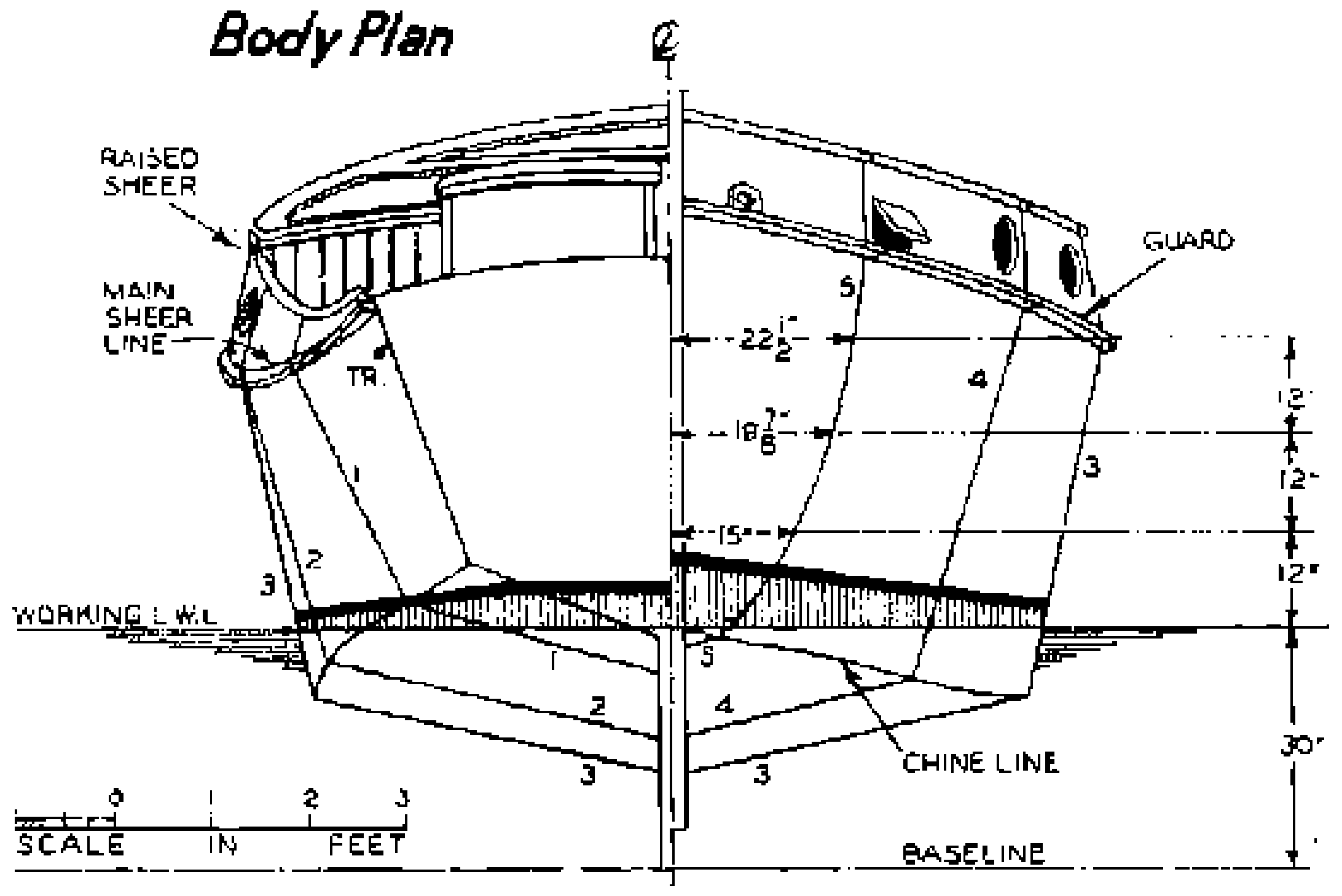
Naval Architect

PART I

HARDLY were the plans for *Buddy* off the press than MODERN MECHANIX boat fans everywhere began to demand a larger boat along the same general lines. The simple construction of this craft placed her within financial reach of every ambitious youngster who could wield a saw and push a plane. Many of the original craft were built with exceptionally fine results; one of them having crossed the Gulf of Mexico.

Men who earn their living today must be back at the office or shop Monday morning and, of course, require a boat that will not require hours to dock. Nevertheless, the craft must be large enough to provide comfortable accommodations for the average family and not cost too much to build. With all of these essential points in mind plans were drawn up for this "ideal" boat and eventually the boat itself was constructed and christened "*Flying Cloud*" after that famous old American vessel. Somehow we feel that the spirit of old Donald McKay, designer of the original sailer, will look down kindly upon our miniature version.

Flying Cloud may be built as cheaply as possible or it may be constructed of expensive materials. The power plant is either a converted auto motor or any inexpensive marine engine. The latter is preferred due to its efficient cooling system which does away with the problem of heat in the cabin. Toilet facilities have been provided and all other necessities of extended cruising have been incorporated into her make-up. The builder can either adopt the cabin plan which we have designed for *Flying Cloud* or fit one of his own to the existing interior. You may fit the sailing rig or leave it off depending on your own whims. As an out and out motor boat she still has pleasing lines and the draft may be made less than shown by taking three inches off the depth of the keel. While it will not be within the scope of this article to go into the detail of laying down the lines and fitting each and every piece of material in the structure we will refer the reader to our *How To Build Twenty Boats* for this information. Materials used in *Flying Cloud* construction may be any locally obtained wood suitable for boat building. *Buddys* were built from as many different materials as are found around the world from New York to Singapore and all are a success. Good solid and well made joints contribute more to the success of any boat than the excellence of the material.

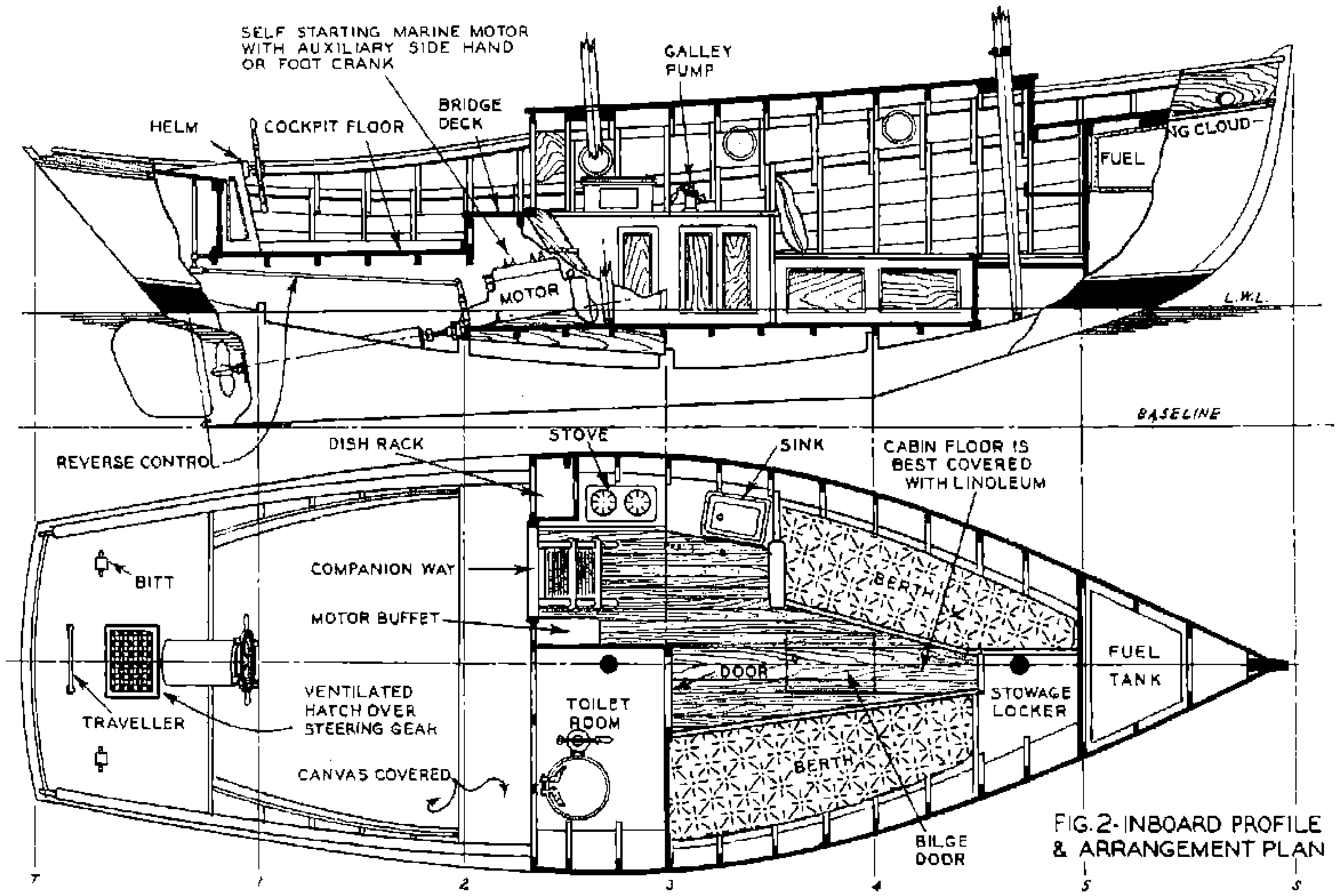


Body Plan

℄
RAISED SHEER
MAIN SHEER LINE
GUARD
TR
WORKING L.W.L.
CHINE LINE
BASELINE
SCALE IN FEET

After the backbone is laid down on a large sheet of building paper the shape of the various parts are transferred to the wood either with a tracing wheel or by driving small brads through the outline, withdraw the paper, leaving the brads standing in the wood. The thickness of the stem and keel timbers are such that the ordinary small workshop bandsaw will handle them but the easier method is to take the timbers to a mill that has a large bandsaw and let them do the job. After the timbers are cut and ready to assemble they should be temporarily held together with clamps and a saw run between each joint until the surface is wood to wood. This process is repeated for each joint of the backbone and after all joints are thus fitted they should be smeared with "Staytite" or other similar cement, or a good roofing cement to exclude water and most of all the destructive toredo found along the seacoast. The joints are made with drift bolts of ½-inch galvanized iron headed up over clinch rings or galvanized iron washers. Holes for the drift bolts are drilled a sixteenth smaller than the bolt and the bolt slightly pointed to enter the hole. This pointing is done cold so as not to harm the galvanizing any more than possible, though bolts with nuts and washers may be used if the builder so prefers. After the backbone is assembled the apron of 2"x6" material is securely fastened to the top of the keel using cement as before to seal the joint. This member is left square until the planking is fitted. The backbone is now set up in its proper position on the ground or shop floor being sure to have the proper slope on the bottom of the keel and the stem perfectly plumb athwartship.

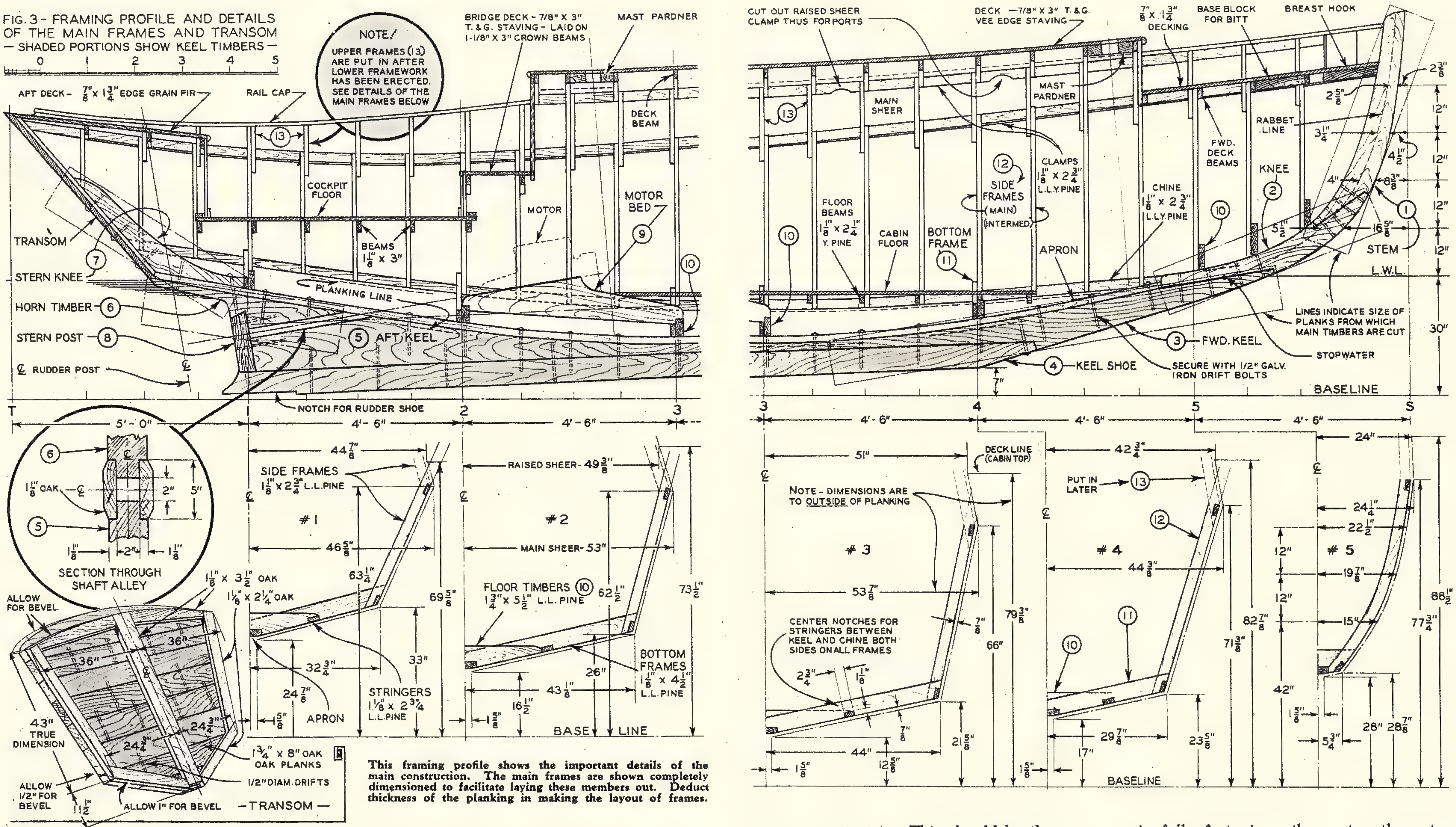
Shown here are the arrangement plans for the ship's interior fittings as well as a profile view of the interior.



SELF STARTING MARINE MOTOR WITH AUXILIARY SIDE HAND OR FOOT CRANK
GALLEY PUMP
BRIDGE DECK
HELM
COCKPIT FLOOR
FUEL
NG CLOUD
MOTOR
L.W.L.
BASELINE
REVERSE CONTROL
DISH RACK
STOVE
SINK
CABIN FLOOR IS BEST COVERED WITH LINOLEUM
BITT
COMPANION WAY
MOTOR BUFFET
BERTH
DOOR
FUEL TANK
STOWAGE LOCKER
VENTILATED HATCH OVER STEERING GEAR
TRAVELLER
TOILET ROOM
CANVAS COVERED
BERTH
BILGE DOOR
T
1
2
3
4
5
S

FIG. 2- INBOARD PROFILE & ARRANGEMENT PLAN

FIG. 3 - FRAMING PROFILE AND DETAILS OF THE MAIN FRAMES AND TRANSOM — SHADED PORTIONS SHOW KEEL TIMBERS —


0 1 2 3 4 5
AFT DECK - 7/8" x 1 3/4" EDGE GRAIN FIR
RAIL CAP
NOTE! UPPER FRAMES (13) ARE PUT IN AFTER LOWER FRAMEWORK HAS BEEN ERECTED. SEE DETAILS OF THE MAIN FRAMES BELOW
BRIDGE DECK - 7/8" X 3" T. & G. STAVING - LAID ON 1-1/8" X 3" CROWN BEAMS
MAST PARDNER
DECK BEAM
COCKPIT FLOOR
MOTOR
MOTOR BED
BEAMS 1 1/8" x 3"
TRANSOM
STERN KNEE
HORN TIMBER ⑥
STERN POST ⑧
℄ RUDDER POST
PLANKING LINE
⑤ AFT KEEL
NOTCH FOR RUDDER SHOE
T 1 2 3
5'-0" 4'-6" 4'-6"
SECTION THROUGH SHAFT ALLEY
1 1/8" OAK
2" 5"
SIDE FRAMES 1 1/8" x 2 3/4" L.L.PINE
#1 #2
44 7/8" 46 5/8" 63 1/4" 69 5/8" 32 3/4" 24 7/8" 33" 1 5/8"
APRON
STRINGERS 1 1/8" x 2 3/4" L.L.PINE
RAISED SHEER - 49 3/8"
MAIN SHEER - 53"
FLOOR TIMBERS ⑩ 1 3/4" x 5 1/2" L.L. PINE
62 1/2" 73 1/2" 26" 43 1/8" 16 1/2"
BOTTOM FRAMES 1 1/8" x 4 1/2" L.L. PINE
BASE LINE
1 1/8" x 3 1/2" OAK
1 1/8" x 2 1/4" OAK
ALLOW FOR BEVEL
36" 36" 24 3/4" 24 3/4"
43" TRUE DIMENSION
1 3/4" x 8" OAK OAK PLANKS
1/2" DIAM. DRIFTS
ALLOW 1/2" FOR BEVEL
ALLOW 1" FOR BEVEL
— TRANSOM —
CUT OUT RAISED SHEER CLAMP THUS FOR PORTS
DECK — 7/8" X 3" T. & G. VEE EDGE STAVING
7/8" x 1 3/4" DECKING
BASE BLOCK FOR BITT
BREAST HOOK
MAIN SHEER
MAST PARDNER
CLAMPS 1 1/8" x 2 3/4" L.L.Y.PINE
⑫ SIDE FRAMES (MAIN) (INTERMED.)
FLOOR BEAMS 1 1/8" x 2 1/4" Y. PINE
CABIN FLOOR
BOTTOM FRAME ⑪
APRON
CHINE 1 1/8" x 2 3/4" L.L.Y.PINE
FWD. DECK BEAMS
KNEE ②
RABBET LINE
STEM ①
L.W.L.
LINES INDICATE SIZE OF PLANKS FROM WHICH MAIN TIMBERS ARE CUT
STOPWATER
③ FWD. KEEL
④ KEEL SHOE
SECURE WITH 1/2" GALV. IRON DRIFT BOLTS
BASELINE
2 3/8" 2 5/8" 3 1/4" 4 1/2" 8 3/8" 4" 5 1/2" 16 5/8" 12" 12" 12" 12" 30" 7"
3 4 5 S
4'-6" 4'-6" 4'-6"
DECK LINE (CABIN TOP)
51" 42 3/4" 24"
NOTE - DIMENSIONS ARE TO OUTSIDE OF PLANKING
PUT IN LATER ⑬
#3 #4 #5
53 7/8" 79 3/8" 66" 7/8"
CENTER NOTCHES FOR STRINGERS BETWEEN KEEL AND CHINE BOTH SIDES ON ALL FRAMES
2 3/4" 1 1/8" 7/8" 21 5/8" 44" 12 5/8" 1 5/8"
44 3/8" 82 7/8" 71 3/8" 29 7/8" 23 5/8" 17"
24 1/4" 22 1/2" 19 7/8" 15" 88 1/2" 77 3/4" 42" 28" 28 7/8" 5 3/4" 1 5/8"

This framing profile shows the important details of the main construction. The main frames are shown completely dimensioned to facilitate laying these members out. Deduct thickness of the planking in making the layout of frames.

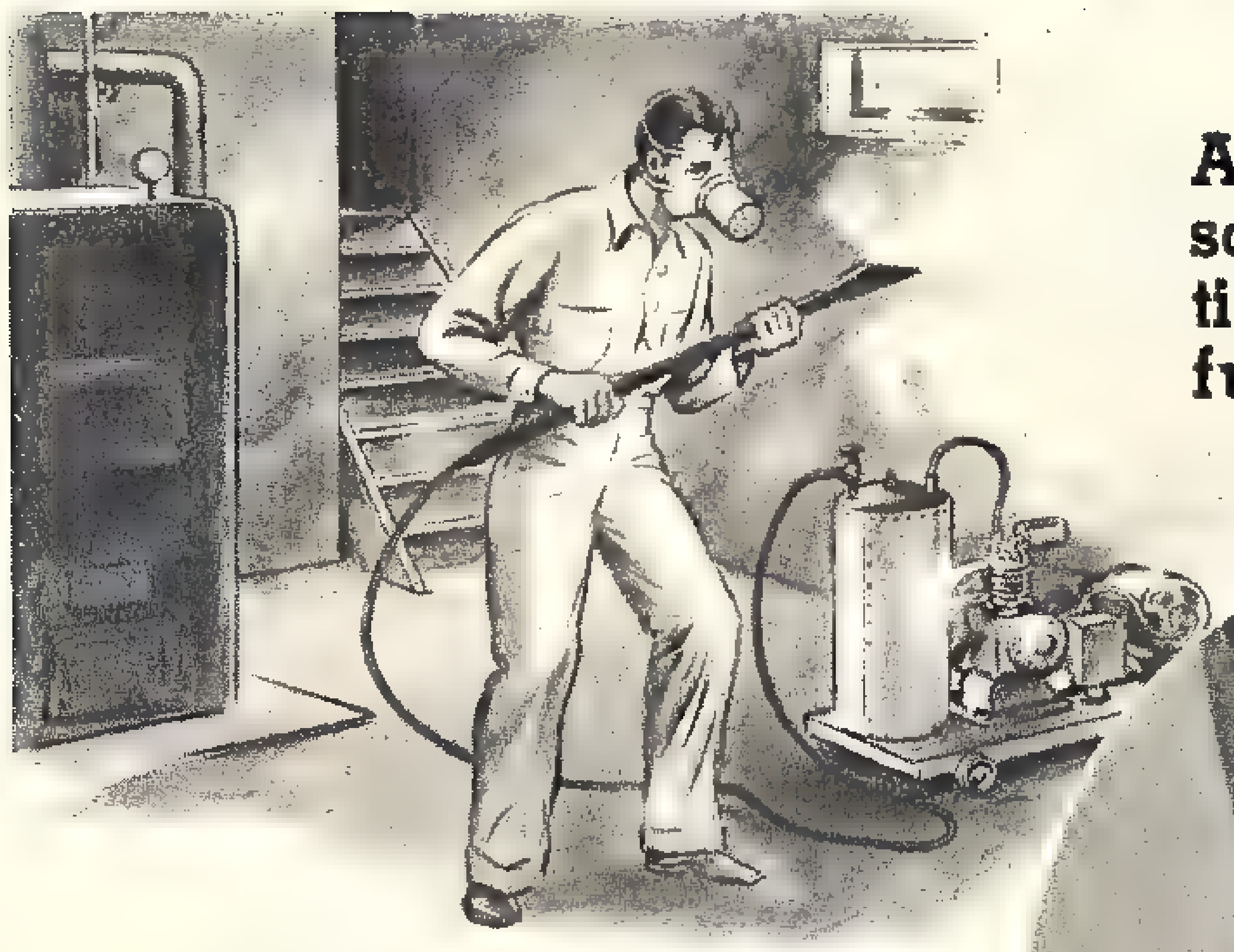
The main frames are now gotten out along with the transom as shown on the plans, deducting the plank thickness, and all joints assembled with ¼″ galvanized carriage bolts, the joints should be well painted with white lead. The notches are cut for the keel, stringers, chines and clamps as shown. The notches for the stringers being half way between the keel and chine or in thirds if two stringers are fitted. The stern knee is set on the keel apron and the transom attached to it. This should be perfectly plumbed and either fastened to the shop rafters to keep it so, or braced to the ground with good heavy shores to keep it from moving. The frames are then fastened to the keel, being sure to keep them at perfect right angles to the keel and set perfectly vertical. After all frames are set up they are checked for plumb and squareness and then securely braced to the shop rafters or the ground so that they will not go out of line while the boat is being constructed. If the structure is erected out in the weather it will be well to give it a coat of good paint to protect it. This should be the procedure even if the boat is built under cover as wood will last a lot longer if properly protected. The best paint to use is one of the new aluminum primers, now on the market either purchased ready mixed or mixed by yourself.

With the frames and transom properly braced, the chines and clamps are bent in, thus tying the structure together rigidly. In bending the chines and clamps the best procedure to follow is to bend them in pairs, thus equalizing the strain on the two sides of the boat. They are best pulled together with a block and fall fastening them to the stem and working aft. They should be procured in one piece if possible, and if this is not possible a butt joint should be made with a reinforcing piece at least three feet long backing up the joint. The intermediate frames are now fitted starting from the transom and working forward. Forward of main frame number four they will begin to take curvature and the shape of these frames is obtained by bending thin strips of wood between frame three and the stem and picking up the shape from these strips or ribbands. The stem rabbet is cut by the same

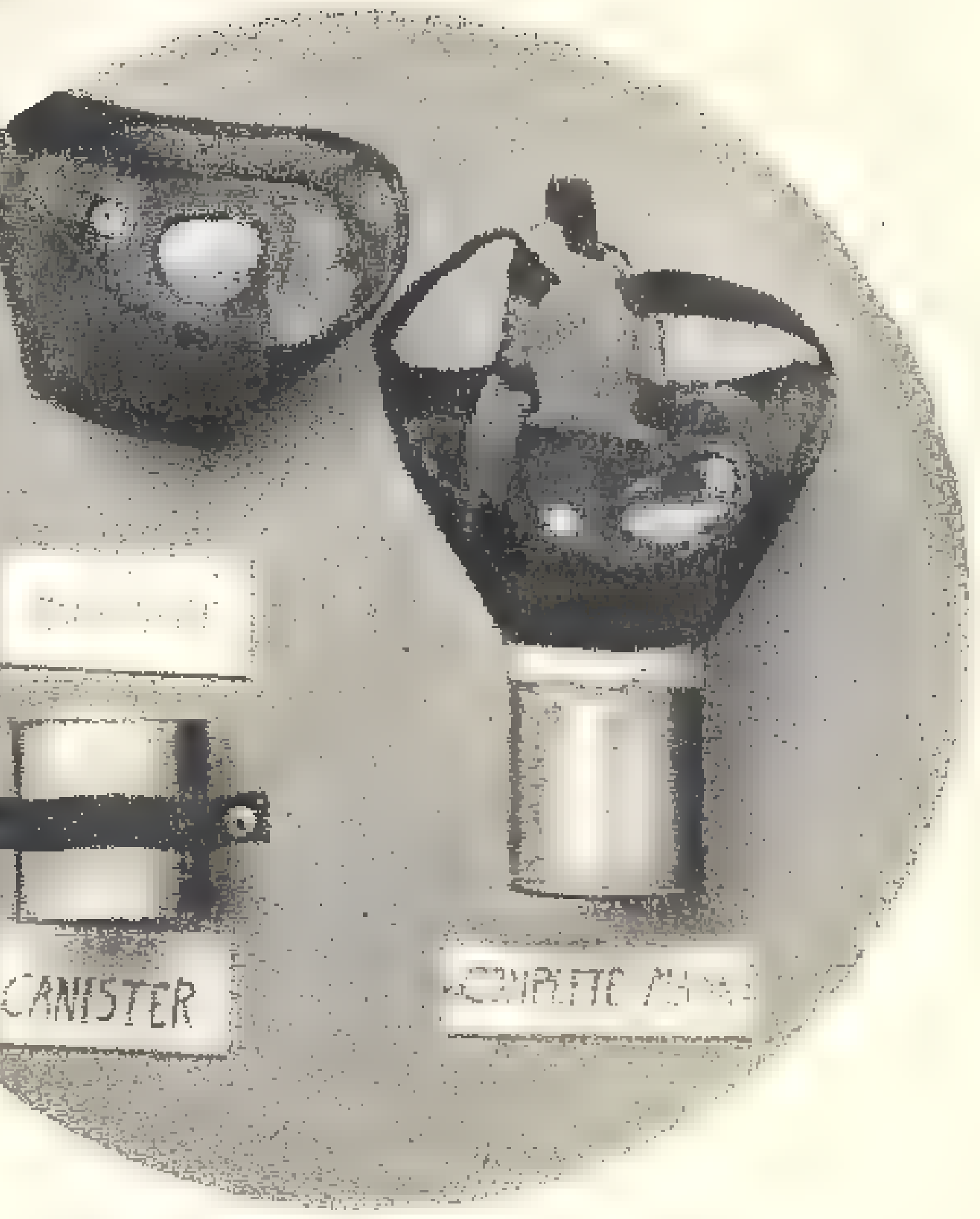
A GAS MASK FOR Fumigating Purposes

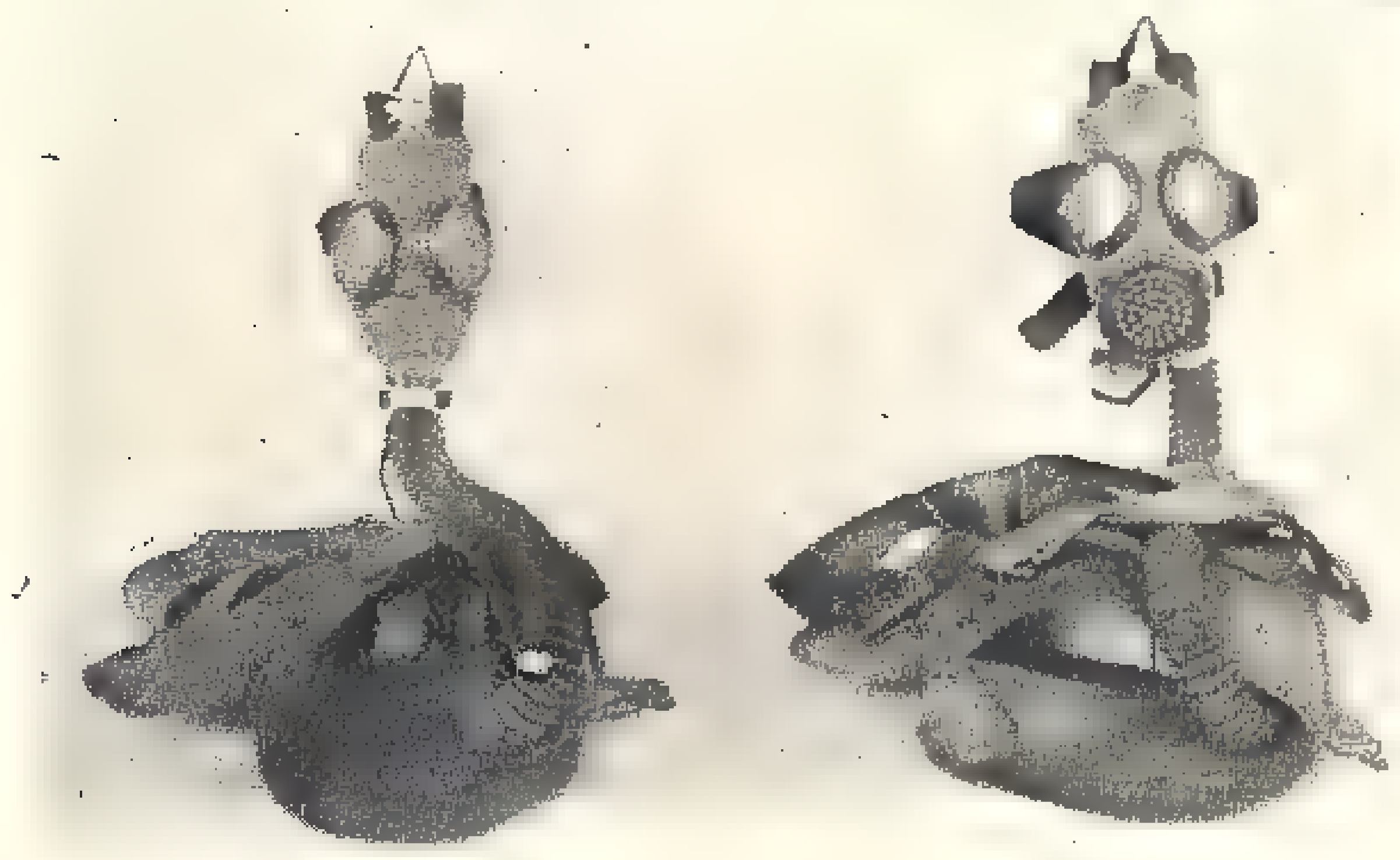
by Major M. E. Barker, C.W.S.

An army officer describes the construction of a practical fumigation mask.



A mask for spraying and fumigating purposes is a necessary protection against dangerous fumes. This practical gas mask is made from ordinary household materials.


CANISTER
COMPLETE MASK



The completed gas mask and basic materials used in constructing mask are pictured above. Left—Two types of commercial masks of practical design.

A SERVICEABLE gas mask which will prove highly efficient when working in smoke and dust can be easily constructed by anyone from common materials and at little or no cost. While the respirator unit about to be described is not as efficient as some commercial types it is, nevertheless, quite satisfactory for ordinary disinfecting use.

A few pieces of duck cloth, leather, celluloid, a tin container, cotton wadding and activated charcoal comprise the materials used in making the mask. Most any workshop will yield all necessary materials except the activated charcoal and this can be obtained at the corner drug store.

To make the respirator a pattern is first drawn on stiff cardboard to the shape and size shown in the pattern illustration. This size is satisfactory for the average adult. If one has an unusual face, a little experimentation will enable one to make the required changes in dimensions to meet his particular needs.

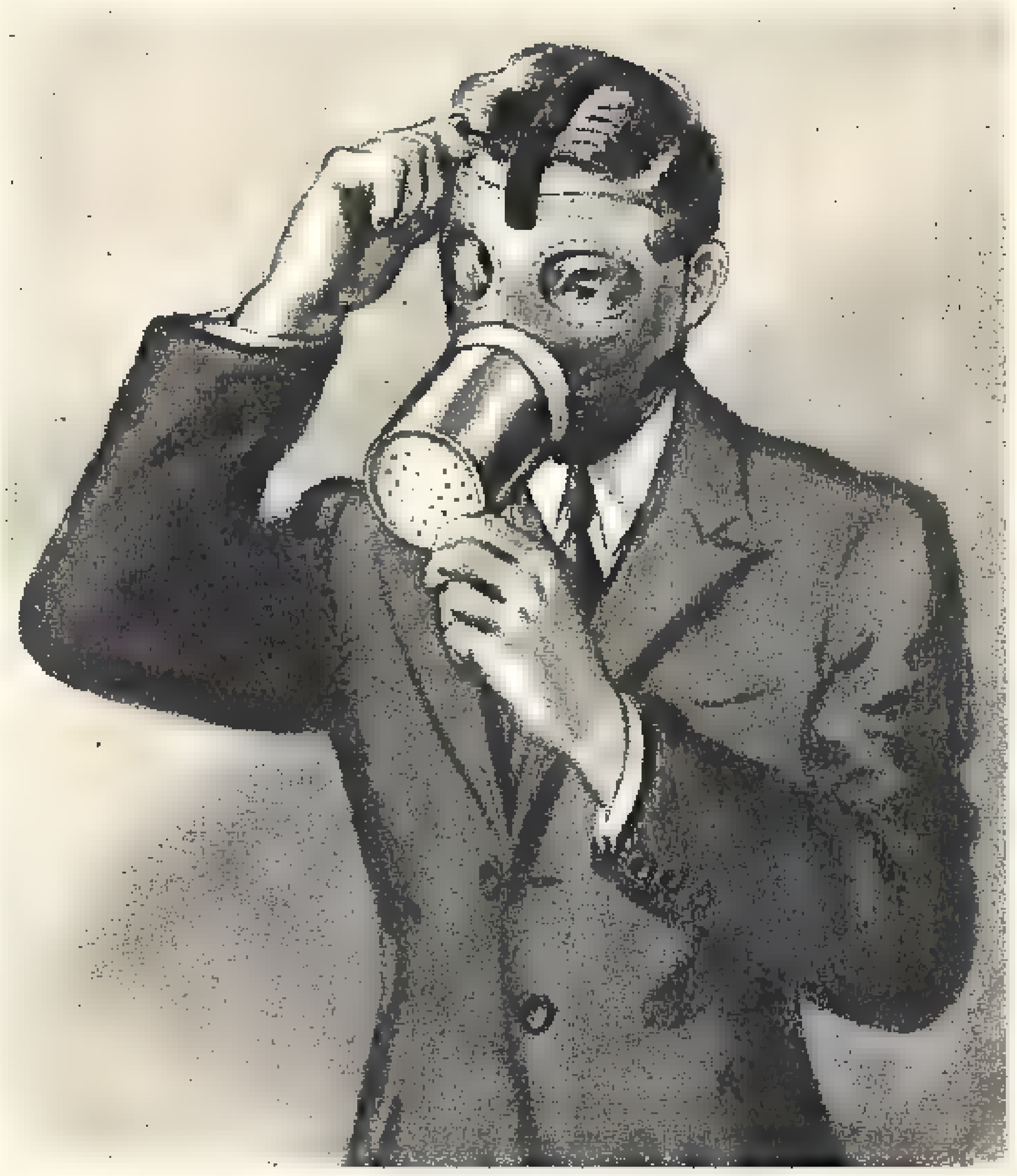
The facepiece is made from double thickness of tightly woven medium weight waterproof duck or leather which is treated on the contact surface between the layers with boiled linseed oil to which has been added 10% of castor oil.

The two faceblanks are cut from selected duck cloth according to pattern made as outlined above. The contact surfaces of the facepieces are dampened with the oil and then stitched in place by hand prior to sewing on a shoe machine. With a little patience all the sewing can be done by hand.

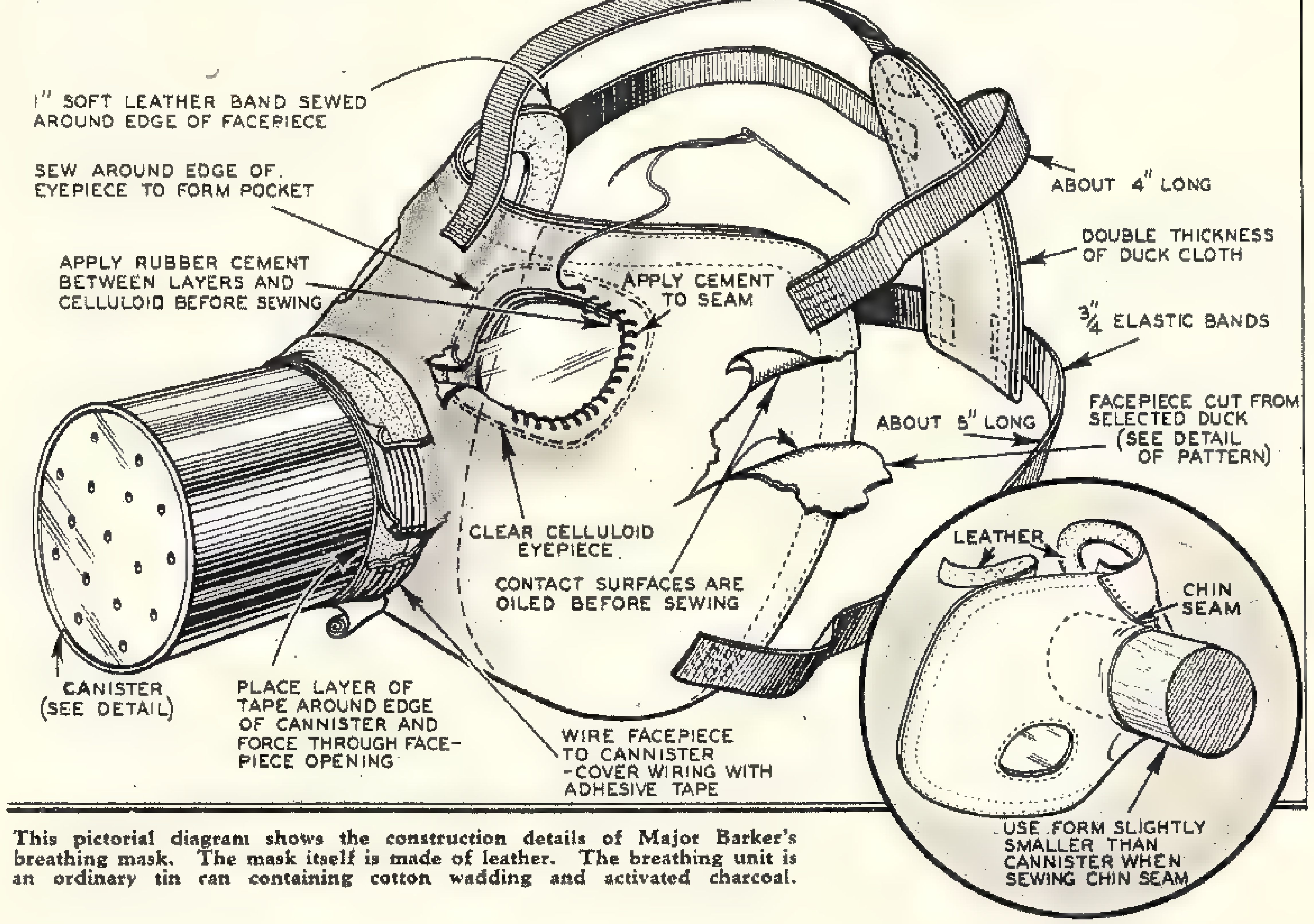
Eyepieces are next cut from clear celluloid or cellulose acetate film in the form of squares approximately three inches on the side with the corners rounded. The eyepieces are then slipped in place between the two layers of the facepiece and the facepiece sewed around the edge of the eyepiece. Cellulose acetate or rubber cement is then applied between the lens and the two layers of the facepiece and the facepiece is sewed through the eyepiece and cement applied to the seam. This procedure is necessary in order to produce a gas tight fit of the eyepieces in a facepiece of this design.

A band of soft leather about one inch wide is cut to fit the inside of the facepiece. This is sewed in place with two seams. The purpose of the soft leather is to give an air tight fit between the edge of the facepiece and the face.

The chin seam is now put together over a piece of wood slightly smaller than the tin can to be used as a canister. The chin seam is thoroughly sewed in place, the leather band inside the outer edge of the facepiece is cut to give a snug fit, and olive drab colored ad-

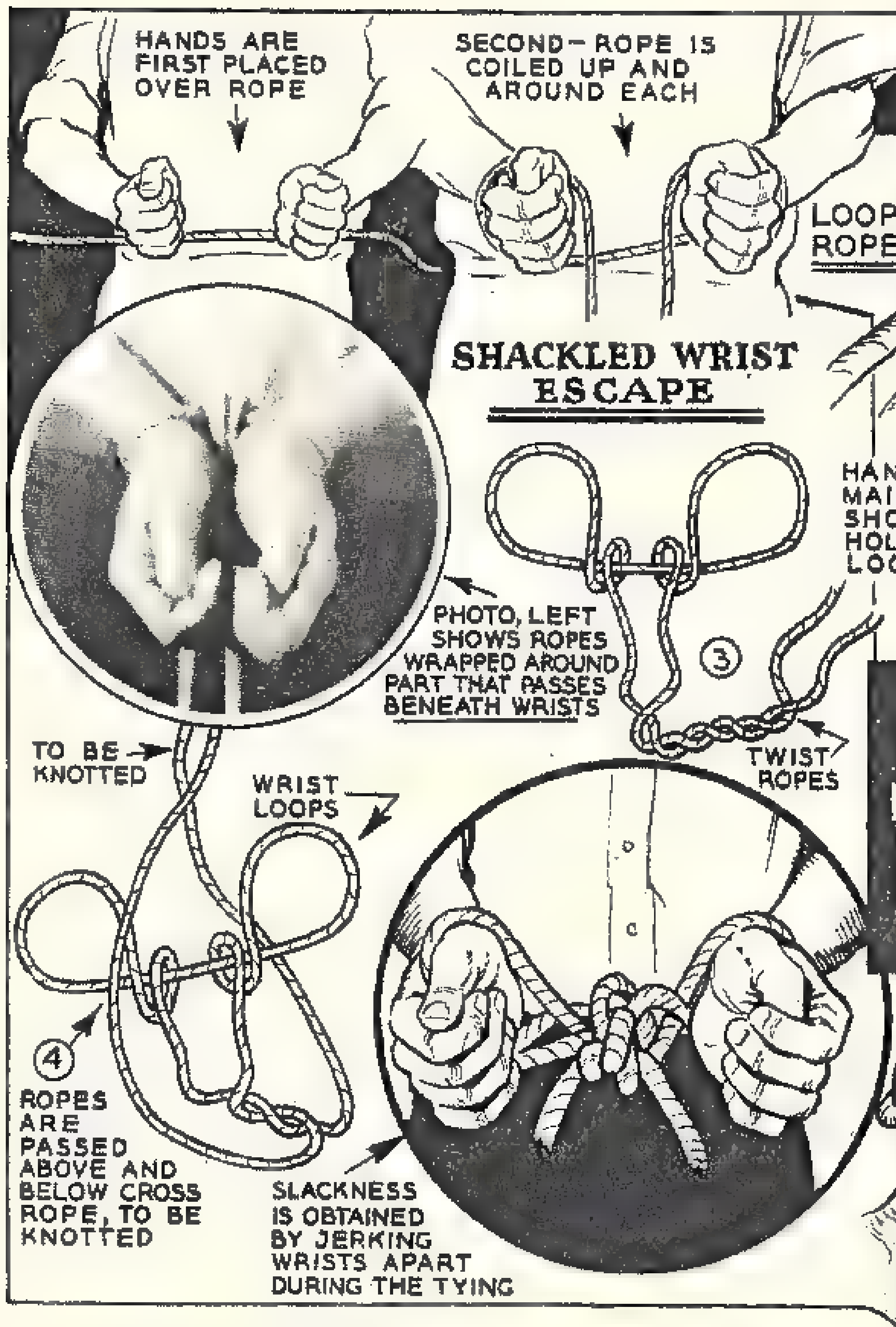


Quickly slipped over the head, the gas mask is ready for immediate use. No annoying breathing tubes are required with this respirator.

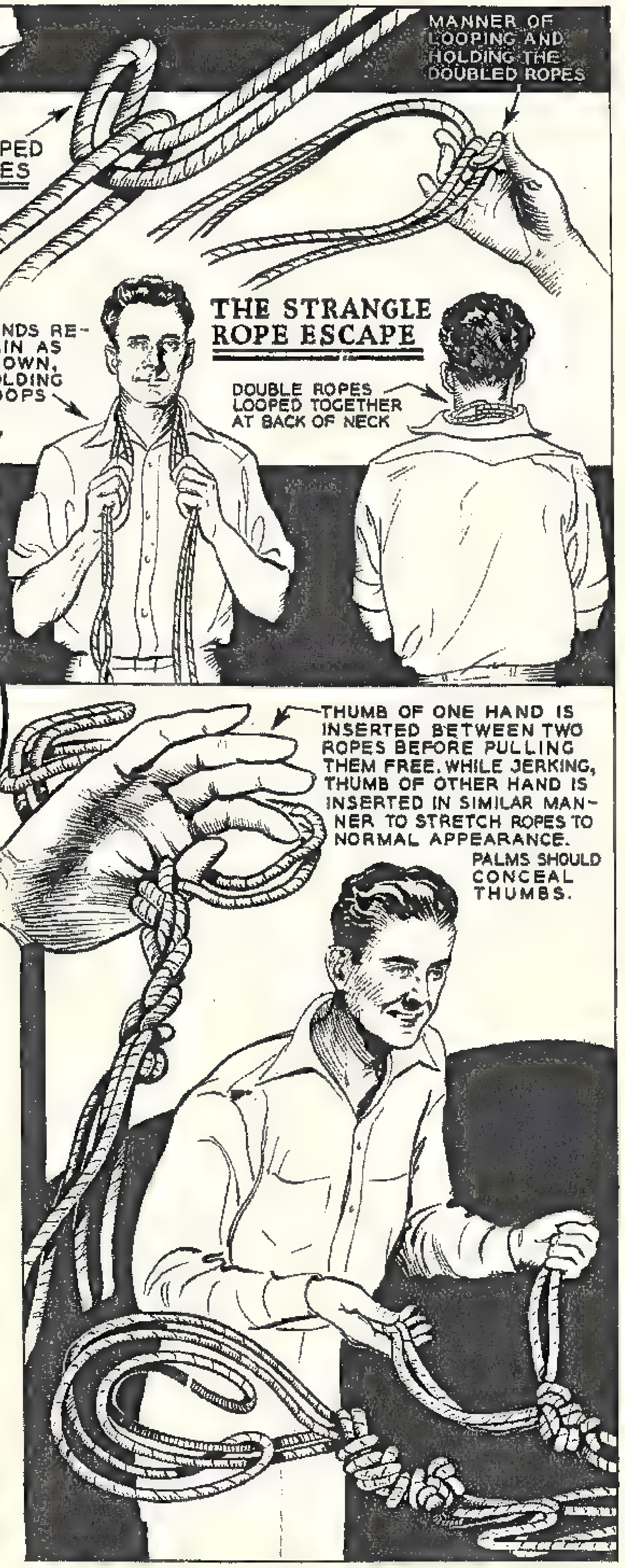

1" SOFT LEATHER BAND SEWED AROUND EDGE OF FACEPIECE
SEW AROUND EDGE OF EYEPIECE TO FORM POCKET
APPLY RUBBER CEMENT BETWEEN LAYERS AND CELLULOID BEFORE SEWING
APPLY CEMENT TO SEAM
ABOUT 4" LONG
DOUBLE THICKNESS OF DUCK CLOTH
3/4 ELASTIC BANDS
ABOUT 5" LONG
FACEPIECE CUT FROM SELECTED DUCK (SEE DETAIL OF PATTERN)
CLEAR CELLULOID EYEPIECE
CONTACT SURFACES ARE OILED BEFORE SEWING
CANISTER (SEE DETAIL)
PLACE LAYER OF TAPE AROUND EDGE OF CANNISTER AND FORCE THROUGH FACE-PIECE OPENING
WIRE FACEPIECE TO CANNISTER -COVER WIRING WITH ADHESIVE TAPE
LEATHER
CHIN SEAM
USE FORM SLIGHTLY SMALLER THAN CANNISTER WHEN SEWING CHIN SEAM

This pictorial diagram shows the construction details of Major Barker's breathing mask. The mask itself is made of leather. The breathing unit is an ordinary tin can containing cotton wadding and activated charcoal.

ROPE STUNTS FOR THE AMATEUR "Escape" ARTIST


HANDS ARE FIRST PLACED OVER ROPE
SECOND—ROPE IS COILED UP AND AROUND EACH
LOOPED ROPES
SHACKLED WRIST ESCAPE
PHOTO, LEFT SHOWS ROPES WRAPPED AROUND PART THAT PASSES BENEATH WRISTS
③
TWIST ROPES
TO BE KNOTTED
WRIST LOOPS
④
ROPES ARE PASSED ABOVE AND BELOW CROSS ROPE, TO BE KNOTTED
SLACKNESS IS OBTAINED BY JERKING WRISTS APART DURING THE TYING

The amateur escape artist can free himself from rope bonds securely tied around his wrists if the rope is wound as indicated in these steps before a member of the audience is permitted to tie up the final knots.


MANNER OF LOOPING AND HOLDING THE DOUBLED ROPES
HANDS REMAIN AS SHOWN, HOLDING LOOPS
THE STRANGLE ROPE ESCAPE
DOUBLE ROPES LOOPED TOGETHER AT BACK OF NECK
THUMB OF ONE HAND IS INSERTED BETWEEN TWO ROPES BEFORE PULLING THEM FREE. WHILE JERKING, THUMB OF OTHER HAND IS INSERTED IN SIMILAR MANNER TO STRETCH ROPES TO NORMAL APPEARANCE.
PALMS SHOULD CONCEAL THUMBS.

Although a double rope around the performer's neck apparently passes completely through it, when the ends are pulled by spectators, the rope actually is a double loop locked in the center with thumb and forefinger.

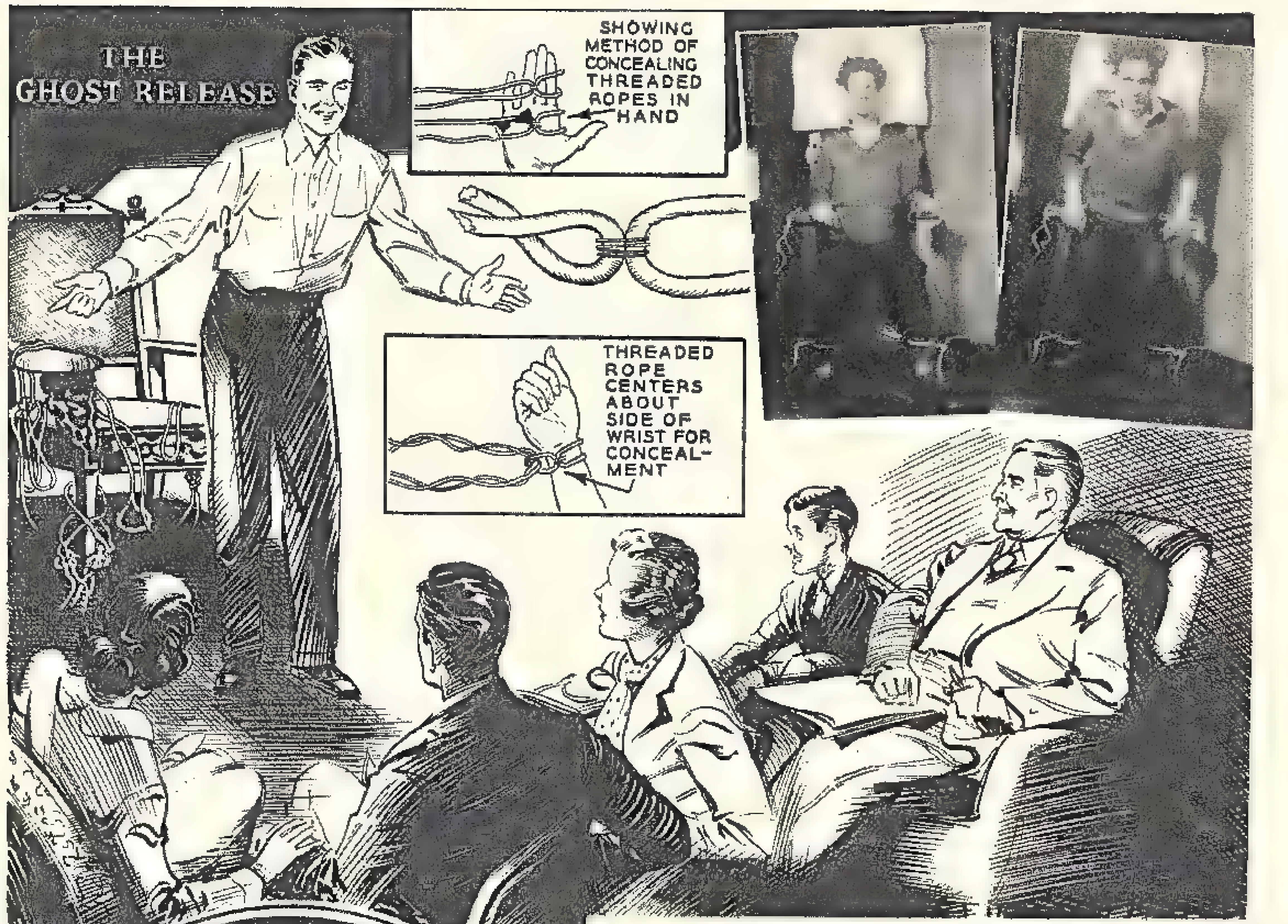
PROVIDED with a hank of sash cord anyone with a little practice can put on an escape act that will compare favorably with similar acts performed by professional magicians. While some people are often led to believe that magic acts and illusions can be performed only by those possessing supernatural powers it should be clearly understood now and always that there is no magician or any other person relying on anything but skill for his effects.

This same rule applies to the amateur magician and escape artist and before actually presenting these stunts to your friends be sure that you have mastered them by performing before a mirror or with a confidential assistant.

A very good stunt for beginning an escape presentation is the "Shackled Wrist Escape." Offer a spectator a length of sash cord and instruct him to tie up your hands by wrapping it around your wrists and bringing it down between the hands then wrapping it around the bottom cord as described in the accompanying illustrations. After doing this, permit the spectator to knot the cords as often as he likes so long as he is satisfied that you are securely bound. Now turn to the audience and announce that you will free your bonds before they can count to ten. Saying this, turn your back to the audience and jerk your wrists. The cords will now be sufficiently loose so that you can free your hands in a moment. Like many escape stunts, this one depends upon the method used in tying the knot.

"The Strangle Rope Escape" is one of the most effective rope tricks ever devised and unquestionably the simplest to perform. Here the performer makes it appear that after he has been securely bound around the neck with a double rope he allows two spectators to grasp each end of the double rope and

[*Continued on page* 126]


THE GHOST RELEASE
SHOWING METHOD OF CONCEALING THREADED ROPES IN HAND
THREADED ROPE CENTERS ABOUT SIDE OF WRIST FOR CONCEALMENT

While apparently bound securely to a chair with doubled rope escape is simple since the ropes are secretly joined together with thread. The joints are concealed from view so that detection by the spectators is almost impossible.

THE WRIST SLIP

Although members of the audience are allowed to bind the performer with a one hundred foot coil of sash rope the escape, which involves no trickery, is simple. The performer depends upon human nature for its success.

"Runlite"—a Compact Traveling Bedroom

65 692
CALIFORNIA 36

Designed for the person who prefers a light portable shelter to a more commodious trailer, this lightweight streamlined modern vehicle is noteworthy for its low cost and safety at high speeds.

Looking into the "cabin" through the open galley hatch. "Runlite" has ample space for two full length spring mattresses. Below—Body plan dimensioned to scale.

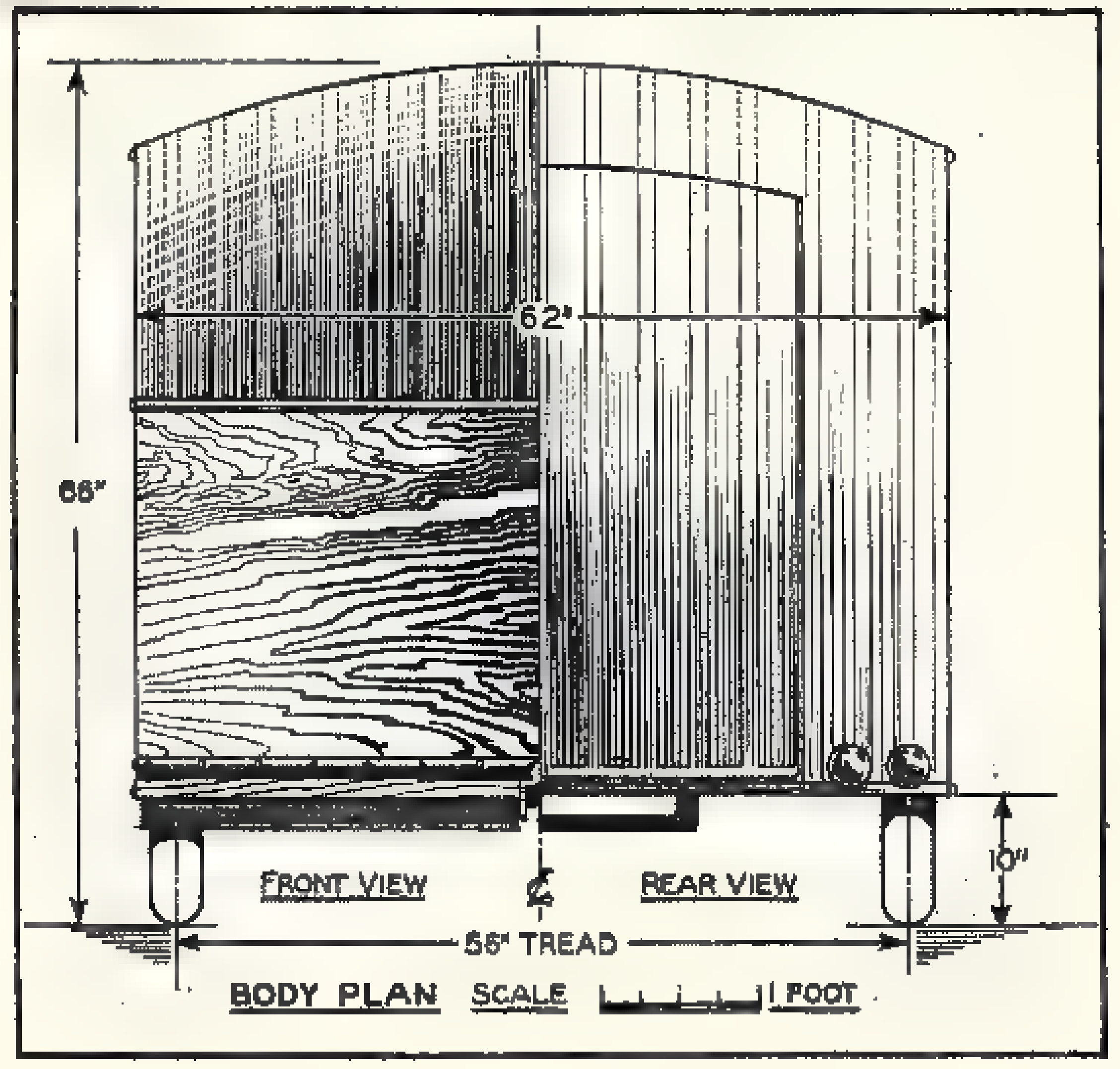
TRAILER owners incline to divide into two schools of thought; one group wanting the kind of trailer in which they can, if necessary, live permanently—the other preferring something rather lighter and more suitable for use on extended trips, such as vacations, where economy and high cruising speeds are of major importance. *Runlite* has been designed for the latter group.

By placing the wheels quite far aft it has been possible to make this an underslung job, making it directly possible to combine really effective streamlining with marked stability. The weight of the whole trailer being so low, much of the weight is carried by the tongue, a matter of no particular concern in the case of *Runlite* since it is normal for a load of 150 or even 200 pounds to be distributed on the hitch of all trailers.

Runlite can actually be towed at a 60 m. p. h. gait without straining any good light car.

Straightforward methods of construction are used in this design. There is practically no welding and absolutely no special machine work to be done. The roof, which at first glance may seem a problem, is actually simpler to construct than that of the average trailer.

Another word before starting in on the actual construction work: Comparison will reveal some slight difference between photos and drawings in this article. It is quite unimportant and, as far as that goes, the curves, the width and the over all height may be modified to suit the builder's requirements.


62"
66"
10"
FRONT VIEW
REAR VIEW
56" TREAD
BODY PLAN
SCALE
1 FOOT

Start with the frame. What few welded joints you will have to make are encountered here. If you lack the proper equipment or experience have the welding done by an expert. The cost will be low and the sense of security a good deal greater.

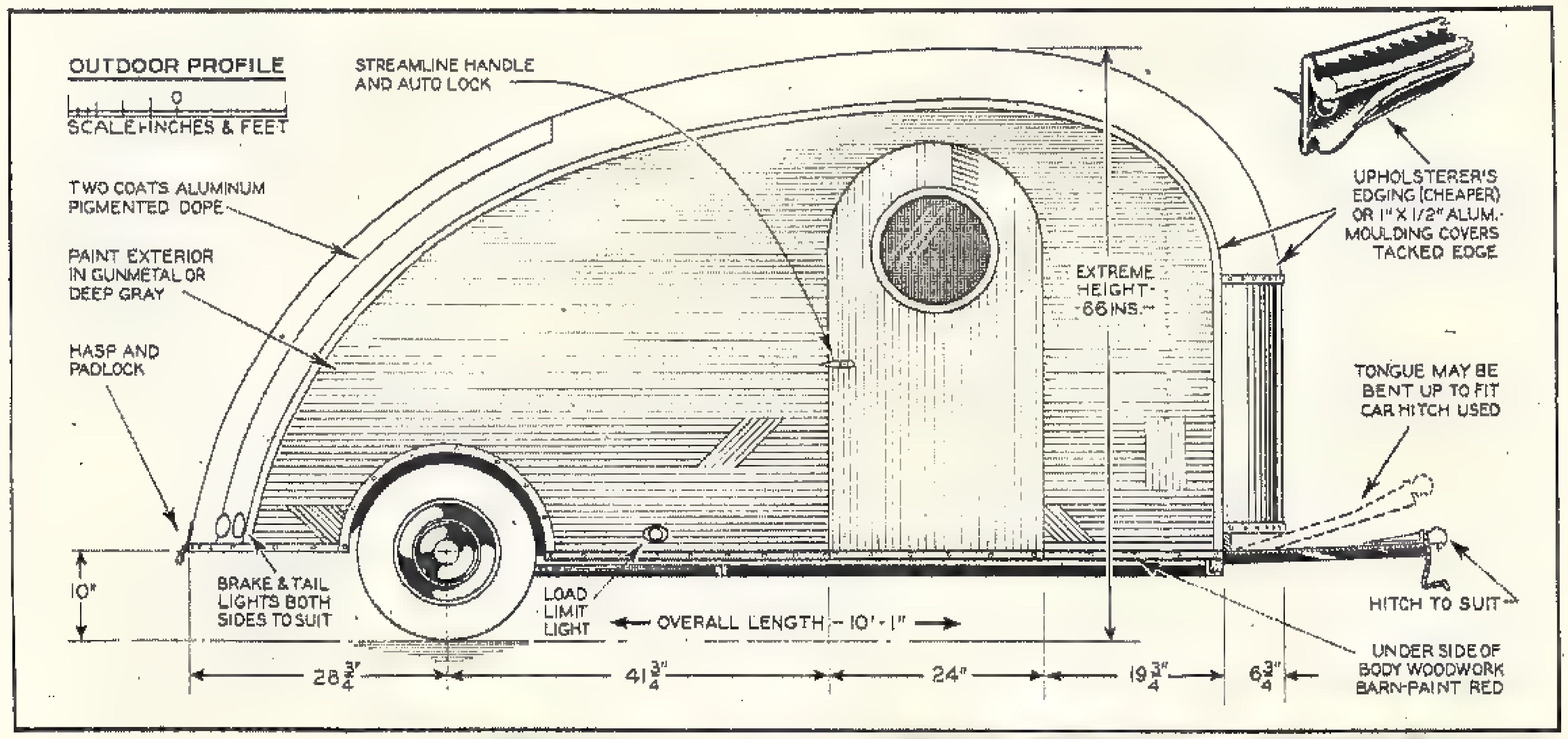
Use an old Model T Ford frame. At your local junk yard these should be anywhere from 75 cents to $2.75. Using a hacksaw, cut out a 13½" length on each side 7" from the front end. Saw out the channels to fit and weld at right angles so that the frame now has a 13½" kick-up as shown in the drawings. An angle iron tie piece 1¼"x1¼"x$\frac{3}{16}$" is welded across the bottom of the frame as shown in the perspective drawing of the frame. At the rear end the rear face of the spring perch is cut off with torch or hacksaw. Into the perch a 2"x4", preferably of white oak, is carefully fitted. This beam should be the full width of the body and its obvious purpose is clearly shown in the drawings. Two more lengths of Ford T frame are used for the trailer tongue and the cross-member to which it is anchored. Joints here may be either by welding or bolting. It will be necessary to cut out the filler piece for the tongue—which is bolted securely to the spring perch as well as to the channel cross piece.

Bolt or weld a standard hitch to end of tongue. The height of hitch can be adjusted by heating tongue and bending upwards.

Only four leaves of the front spring are used. A shim is put in under the perch clip bottom to compensate for the leaves removed. Second hand Model T steering tie rods are used in the manner shown for radius rods. The ball and socket fixtures for the frame end of the rods are from regular Ford radius rods. They should be welded on. The axle ends of the rods may be attached either by flattening and bolting direct to the wing spring perches, as shown, or drilled clear through the axle and bolted either side. This latter method provides an easy method of aligning the wheels.

20"x4" wheels from a motorcycle pick-up trailer are used. Such wheels fit Model T Ford spindles without change. They cost about $4.00 each and the tires about the same.

The completed frame, ball hitch, radius rods.


OUTDOOR PROFILE
0
SCALE-INCHES & FEET
STREAMLINE HANDLE AND AUTO LOCK
TWO COATS ALUMINUM PIGMENTED DOPE
PAINT EXTERIOR IN GUNMETAL OR DEEP GRAY
HASP AND PADLOCK
UPHOLSTERER'S EDGING (CHEAPER) OR 1" X 1/2" ALUM. MOULDING COVERS TACKED EDGE
EXTREME HEIGHT 66 INS.
TONGUE MAY BE BENT UP TO FIT CAR HITCH USED
10"
BRAKE & TAIL LIGHTS BOTH SIDES TO SUIT
LOAD LIMIT LIGHT
OVERALL LENGTH 10'-1"
HITCH TO SUIT
UNDER SIDE OF BODY WOODWORK BARN-PAINT RED
28¾"
41¾"
24"
19¾"
6¾"

The profile lines of "Runlite," accurately scaled above, convey immediately grace and speed of the design. While the basic design should not be tampered with, headroom and width can be increased, if builder wishes, without harming the appearance of fast stepping trailerette.

●

Photograph here shows to advantage the charm small trailers of this type hold. Note excellent proportions of this vast pocket trailer—its very low-hung position, practical cooking facilities, obvious roominess. Hardly higher than small car, it sleeps and feeds two adults!

wheels and tires should not cost over $20.00 with welding included.

The steering tie rod is cut in two, the ends flattened and bolted to the axle as shown. This completes the entire chassis and the rest of the job is straight woodwork (with a little tin work here and there).

Build the floor as a foundation for the body. Second grade Oregon pine flooring, tongued and grooved, is bolted to the chassis frame starting at the rear end and working toward the towing end of the trailer. This flooring should be wide enough to finish 61½″ wide after trimming the sides for straightness. Rabbet the first plank laid to hold the ¼″ bulkhead as shown and cut out where necessary for the spring perch at the towing end. This cut out is later covered with tin—see drawings. Lay a straightedge along the sides and saw off flush.

Next screw in the 1″x2″ and 2″x2″ stringers to the underside of the flooring as shown in the drawings, allowing the ends to project several inches beyond the floor at the rear. Stanchions No. 3 and the 2″x4″ uprights are mortised into these projecting ends and the stringers trimmed off flush as shown in the detail sketches.

The stanchion framing can now be completed. The heels of the stanchions are boxed into the floor and bolted into the 1″x2″ edge or side piece. With the main stanchions in the ¼″ plywood or hard Celotex bulkheads can be installed and the boxes for the wheels built up. Framing for cupboards, water tank, sink and so forth is left until the body has been built.

Cut out the crown carlins and also the bow plate. Detail drawings give the dimensions and it will be noted that 11 carlins in all are required. Some of these are used for the roof—three being bolted to the main stanchions already installed. The remaining carlins are required for bow and stern, and for the hatch. Install the bow plate in the manner shown. It is cut on a 72″ radius, is ¾″ thick and 6¾″ deep. It is screwed to the riser strip which in turn is bolted to the filler piece in the spring perch.

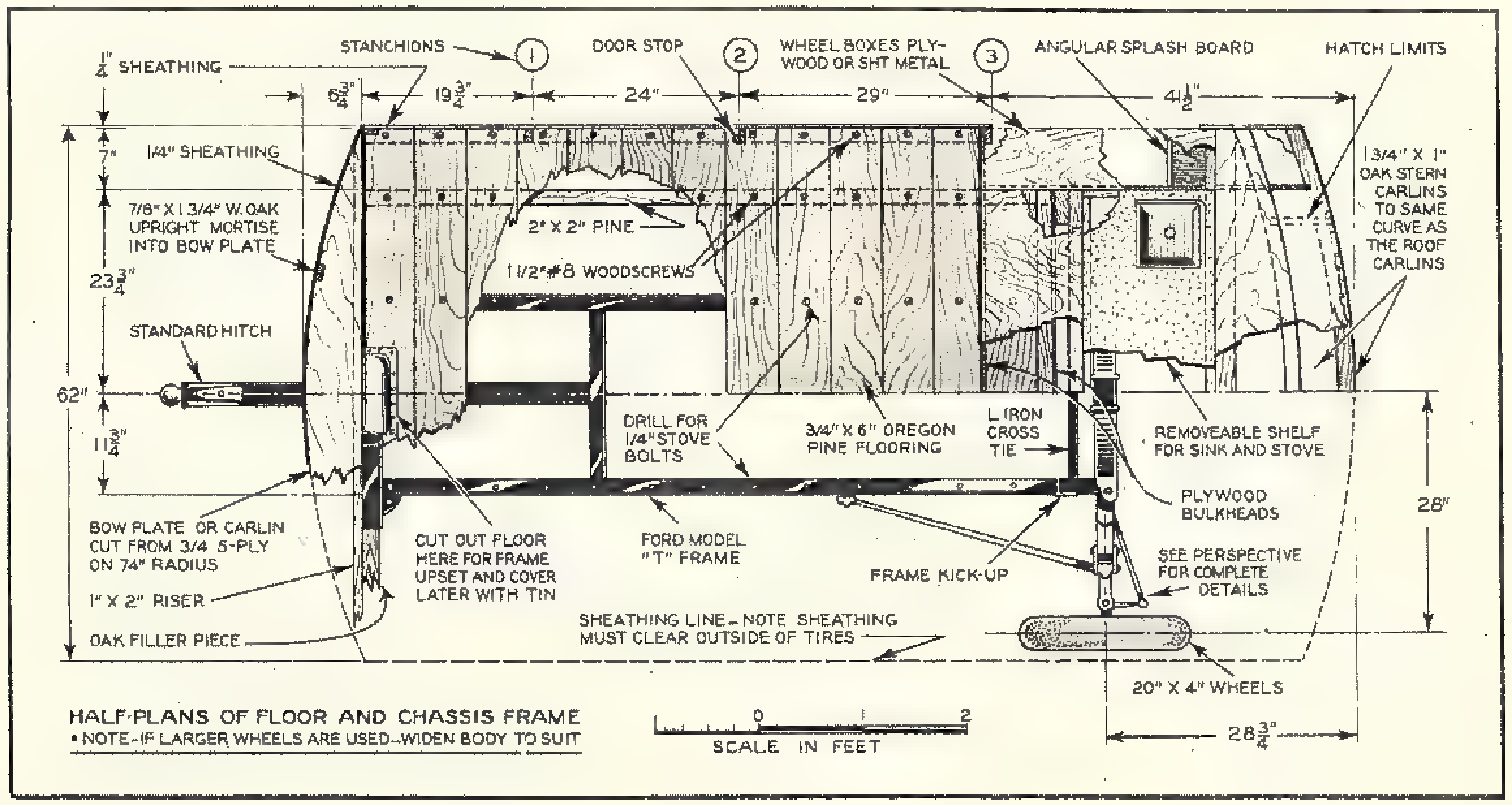
The side clamps or roof strips can now be sawed to shape and mortised into the tops of the stanchions as shown. They may be lightly screwed until the outer sheathing is applied. This sheathing, of fir plywood, ¼″ thick, or hard Celotex, is screwed directly to the stanchions, floor edges and 1″x2″ outer strips. The carlins at front and back of the trailer are put in with knees as shown. Do not apply the sheathing to the front end of the trailer until the roof battens have been bent in. If these prove stiff, soaking for half a day under the lawn sprinkler will render them pliable. They are fastened over the carlins without notches except where they bend into the front, or bow cabin. They are notched flush into this former. Use light screws to secure the roof battens.

The lift-up cover over the galley, called a hatch in the drawings, is built up in the manner shown. The longitudinal carlins are cut to the same sweep as the roof from ¾″ plywood. Cut out four of these carlins, two of them being permanently attached to the stern portion of the body frame as shown. The other two of course form the sides of the hatch itself. A tin gutter should be hammered out and fitted along the edges of the hatch opening in the manner shown.

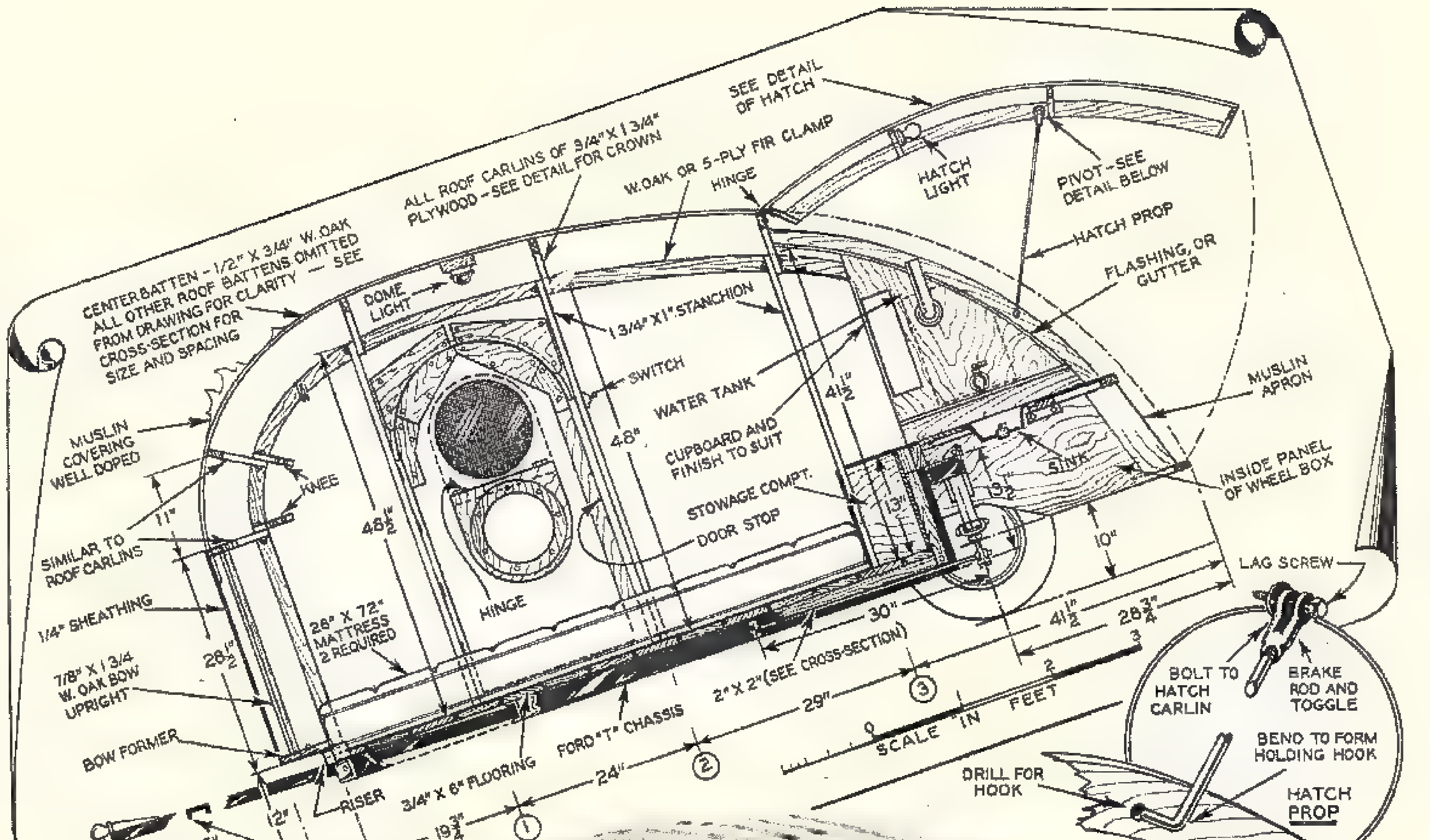
Attach the sheathing to the front end now. It will bend to the slight curve quite easily.

The door is clearly indicated. Lock arrangement and so on is left to the builder though a streamlined blind door handle was used on the trailer pictured. A 12″ porthole is cut into the door and another one exactly opposite in the sheathing on the other side. A screen is secured to the outside of each port and inside they are furnished with hinged windows as clearly shown. Glass or

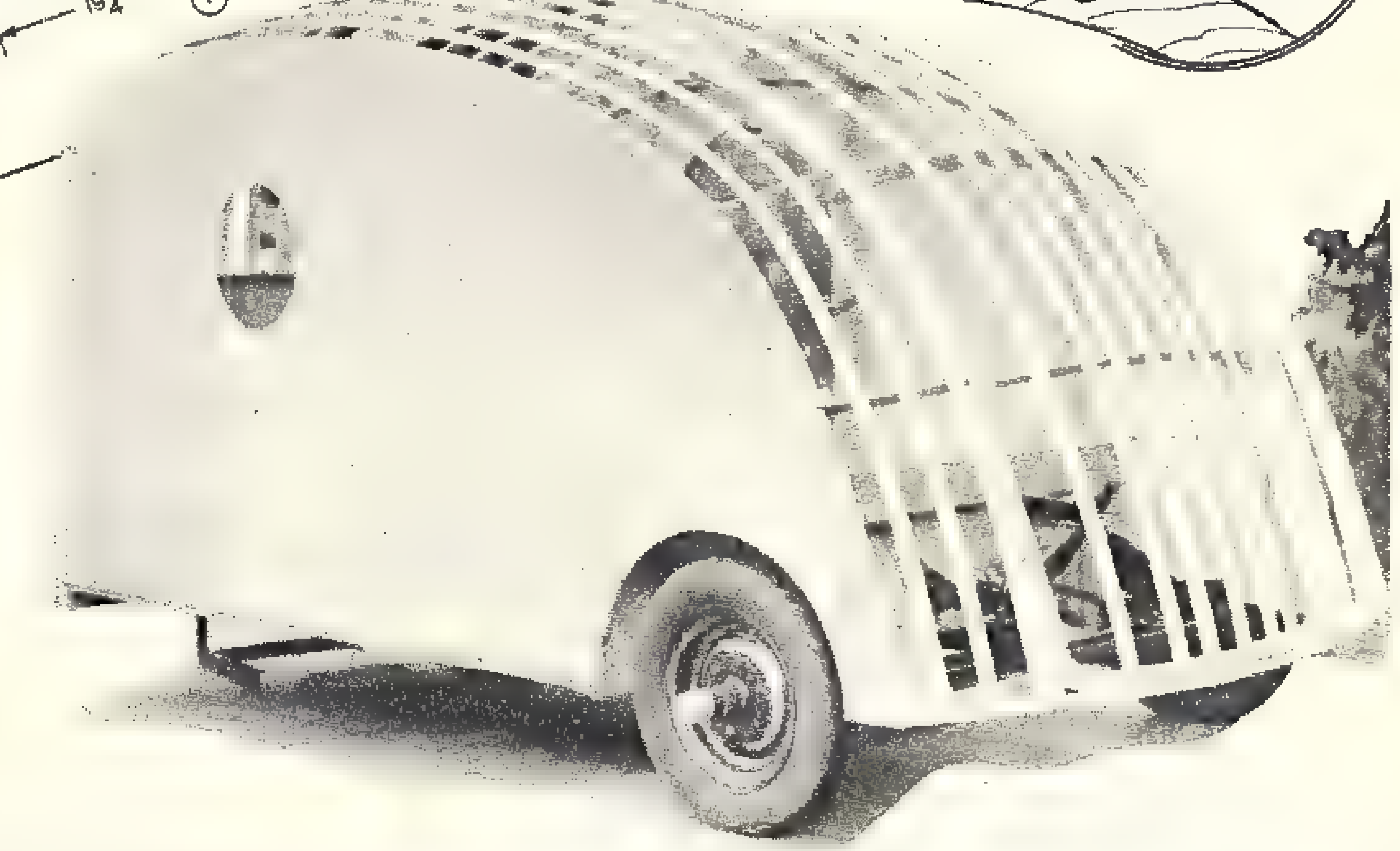
These plan views of the trailer, chassis and floor frame, used in conjunction with indoor profile plans on the following page (and the sectional views of the body), should be studied carefully.



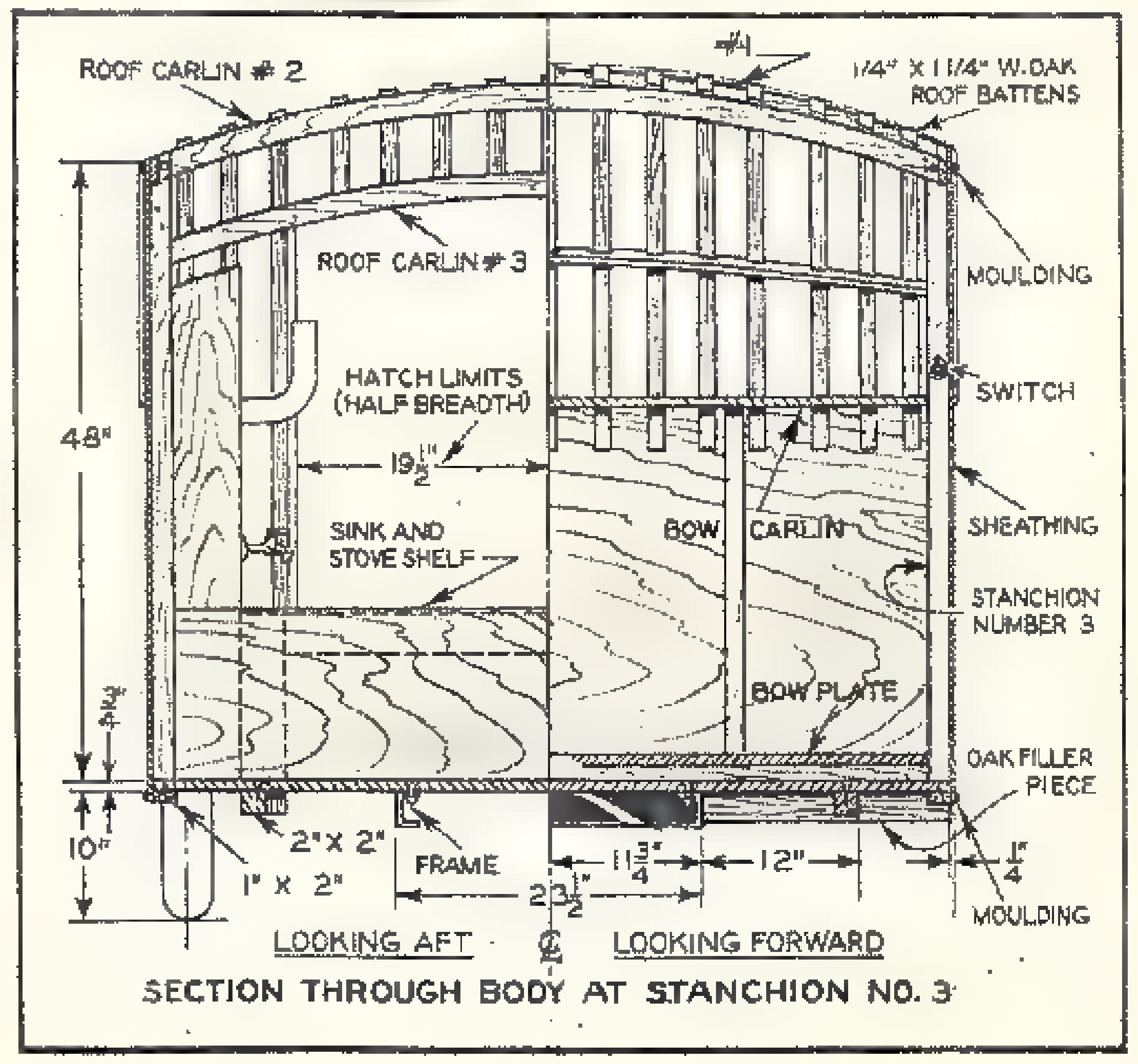
1/4" SHEATHING
STANCHIONS
1
DOOR STOP
2
WHEEL BOXES PLYWOOD OR SHT METAL
3
ANGULAR SPLASH BOARD
HATCH LIMITS
6 3/4"
19 3/4"
24"
29"
41 1/2"
7"
1/4" SHEATHING
7/8" X 1 3/4" W. OAK UPRIGHT MORTISE INTO BOW PLATE
23 3/4"
2" X 2" PINE
1 1/2" #8 WOODSCREWS
1 3/4" X 1" OAK STERN CARLINS TO SAME CURVE AS THE ROOF CARLINS
STANDARD HITCH
62"
11 3/4"
DRILL FOR 1/4" STOVE BOLTS
3/4" X 6" OREGON PINE FLOORING
L IRON CROSS TIE
REMOVEABLE SHELF FOR SINK AND STOVE
PLYWOOD BULKHEADS
28"
BOW PLATE OR CARLIN CUT FROM 3/4 5-PLY ON 74" RADIUS
1" X 2" RISER
OAK FILLER PIECE
CUT OUT FLOOR HERE FOR FRAME UPSET AND COVER LATER WITH TIN
FORD MODEL "T" FRAME
FRAME KICK-UP
SEE PERSPECTIVE FOR COMPLETE DETAILS
SHEATHING LINE – NOTE SHEATHING MUST CLEAR OUTSIDE OF TIRES
20" X 4" WHEELS
28 3/4"
HALF-PLANS OF FLOOR AND CHASSIS FRAME
• NOTE – IF LARGER WHEELS ARE USED – WIDEN BODY TO SUIT
0
1
2
SCALE IN FEET



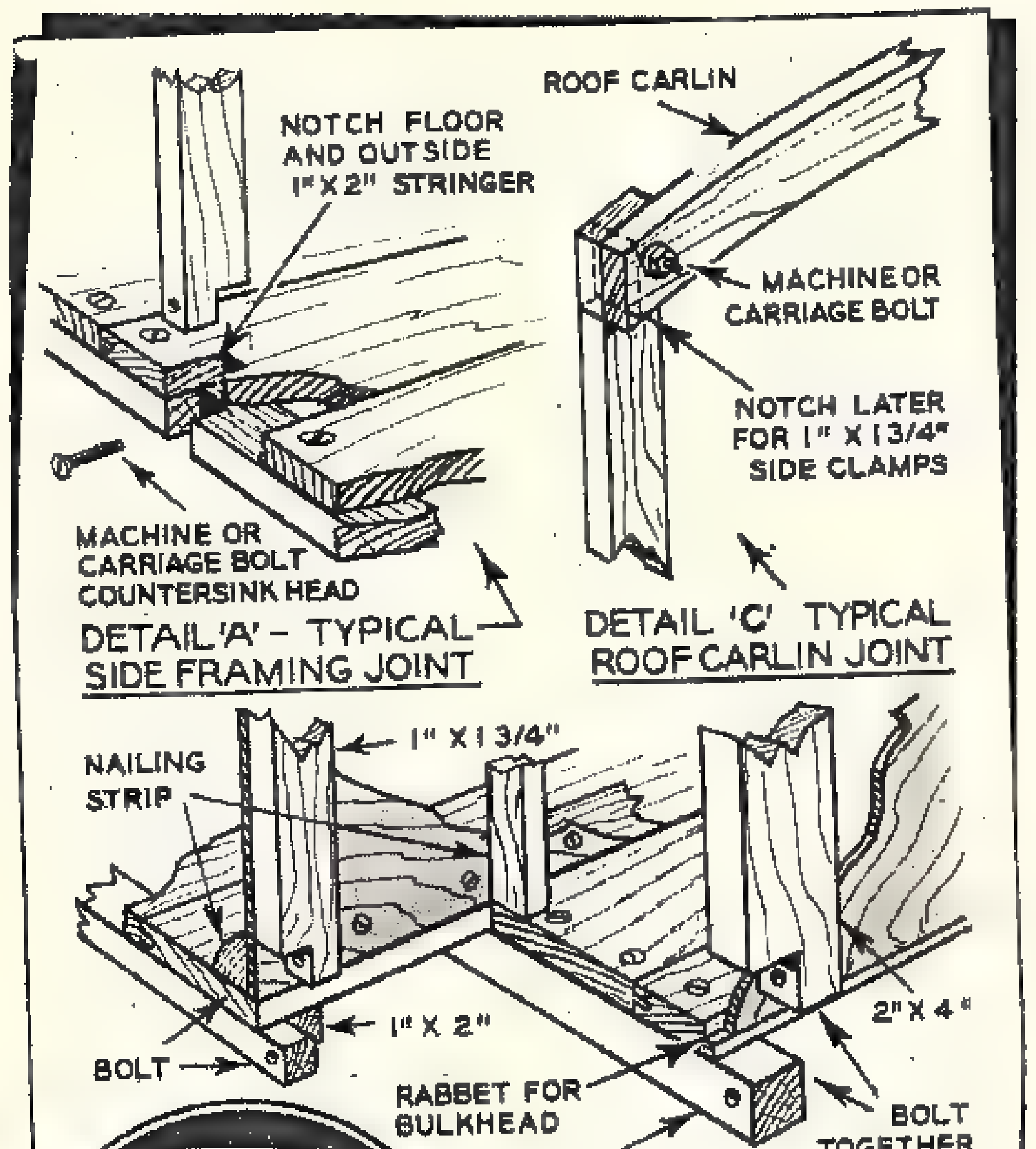
CENTER BATTEN – 1/2" X 3/4" W. OAK ALL OTHER ROOF BATTENS OMITTED FROM DRAWING FOR CLARITY — SEE CROSS-SECTION FOR SIZE AND SPACING
ALL ROOF CARLINS OF 3/4" X 1 3/4" PLYWOOD – SEE DETAIL FOR CROWN
W. OAK OR 5-PLY FIR CLAMP
HINGE
SEE DETAIL OF HATCH
HATCH LIGHT
PIVOT – SEE DETAIL BELOW
HATCH PROP
FLASHING, OR GUTTER
DOME LIGHT
1 3/4" X 1" STANCHION
SWITCH
WATER TANK
CUPBOARD AND FINISH TO SUIT
STOWAGE COMPT.
DOOR STOP
48"
41 1/2"
13"
3 1/2
SINK
MUSLIN APRON
INSIDE PANEL OF WHEEL BOX
10"
MUSLIN COVERING WELL DOPED
KNEE
11"
SIMILAR TO ROOF CARLINS
48 1/2"
1/4" SHEATHING
HINGE
28 1/2"
7/8" X 1 3/4 W. OAK BOW UPRIGHT
26" X 72" MATTRESS 2 REQUIRED
BOW FORMER
RISER
3/4" X 6" FLOORING
FORD "T" CHASSIS
2" X 2" (SEE CROSS-SECTION)
30"
41 1/2"
28 3/4"
LAG SCREW
BOLT TO HATCH CARLIN
BRAKE ROD AND TOGGLE
BEND TO FORM HOLDING HOOK
DRILL FOR HOOK
HATCH PROP
12"
MODEL "T" FRAME
6 3/4
19 3/4"
1
24"
2
29"
3
0
1
2
3
SCALE IN FEET
LENGTH TO SUIT – 24" RECOMMENDED
INDOOR PROFILE



Drawing above, in conjunction with the cross-section drawing below, gives many details and dimensions which will be helpful to builder. Lines for curve of roof edge should be taken off "outdoor" profile drawing, or at least checked from that plan. Completed body, ready to be covered, shown at right, will aid in reading the plans shown.



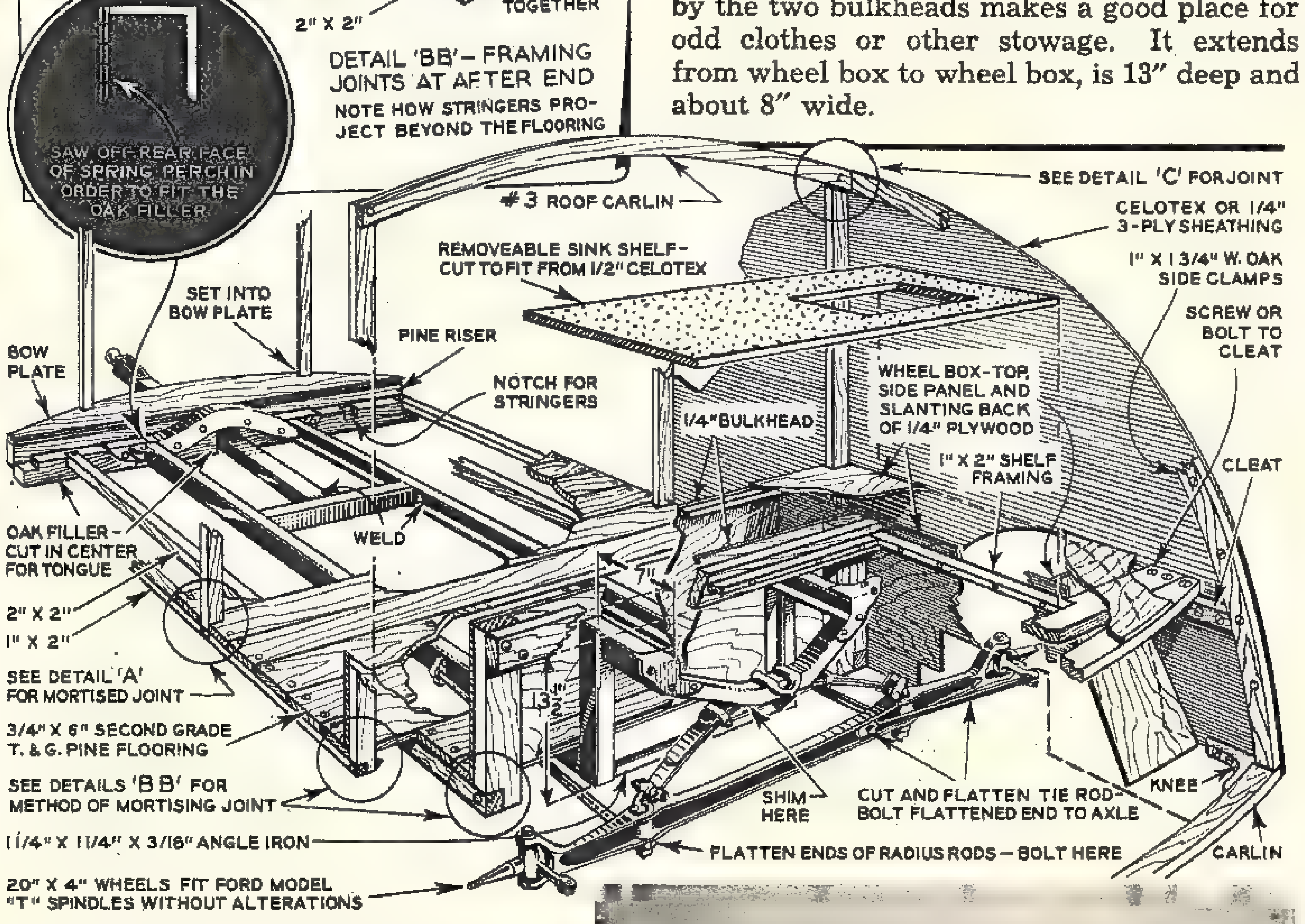
ROOF CARLIN # 2
#4
1/4" X 1 1/4" W. OAK ROOF BATTENS
ROOF CARLIN # 3
MOULDING
HATCH LIMITS (HALF BREADTH)
SWITCH
48"
19 1/2"
SHEATHING
SINK AND STOVE SHELF
BOW
CARLIN
STANCHION NUMBER 3
BOW PLATE
6 3/4
OAK FILLER PIECE
10"
2" X 2"
1" X 2"
FRAME
11 3/4"
12"
23 1/2"
1/4
MOULDING
LOOKING AFT
℄
LOOKING FORWARD
SECTION THROUGH BODY AT STANCHION NO. 3


ROOF CARLIN
NOTCH FLOOR AND OUTSIDE 1"X2" STRINGER
MACHINE OR CARRIAGE BOLT
NOTCH LATER FOR 1" X 1 3/4" SIDE CLAMPS
MACHINE OR CARRIAGE BOLT COUNTERSINK HEAD
DETAIL 'A' - TYPICAL SIDE FRAMING JOINT
DETAIL 'C' TYPICAL ROOF CARLIN JOINT
NAILING STRIP
1" X 1 3/4"
1" X 2"
2" X 4"
BOLT
RABBET FOR BULKHEAD
BOLT TOGETHER
2" X 2"
DETAIL 'BB' - FRAMING JOINTS AT AFTER END
NOTE HOW STRINGERS PROJECT BEYOND THE FLOORING

airplane windshield pyralin are equally satisfactory for these windows. It has been found that the two ports provide ample ventilation for even the hottest weather.

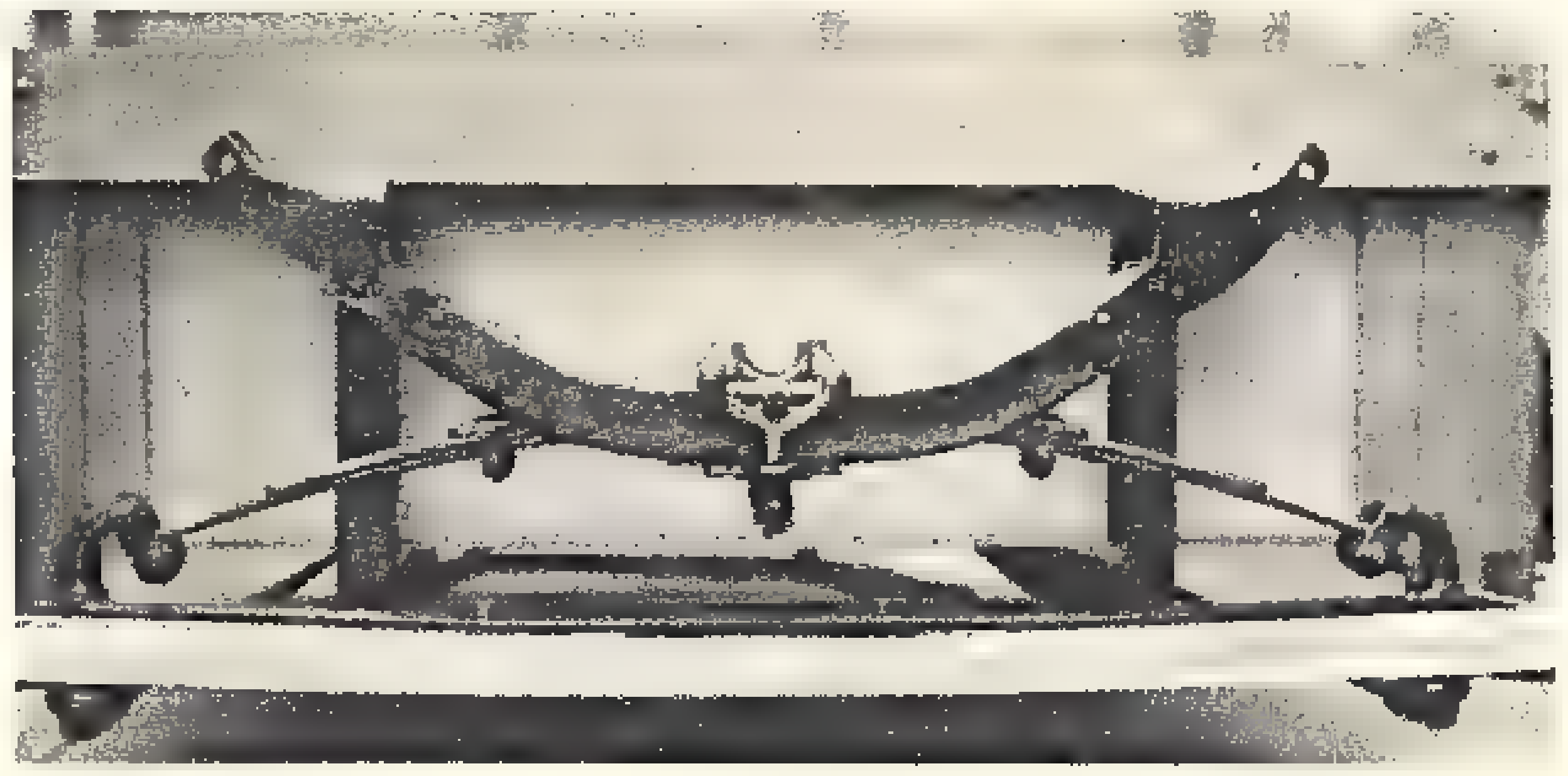
The next step is to cover the roof. Use grade A muslin costing 18 to 24 cents a yard at most stores. Start at the front end, tacking on 1" centers with small carpet tacks, and stretch lightly over the sides as you proceed toward the rear until the tail carlin is reached. With two gallons of aluminum pigmented nitrate dope you will be able to render the roof drum tight and waterproof. Correct procedure in doping cloth is to lay the first coat on around the edges and work toward the center. The edges can be finished with either aluminum edging or regular upholsterer's edging. Both are obtainable at automobile stores.

The galley is pretty thoroughly covered in the various drawings. The space formed by the two bulkheads makes a good place for odd clothes or other stowage. It extends from wheel box to wheel box, is 13" deep and about 8" wide.


SAW OFF REAR FACE OF SPRING PERCH IN ORDER TO FIT THE OAK FILLER
#3 ROOF CARLIN
SEE DETAIL 'C' FOR JOINT
CELOTEX OR 1/4" 3-PLY SHEATHING
1" X 1 3/4" W. OAK SIDE CLAMPS
REMOVEABLE SINK SHELF-CUT TO FIT FROM 1/2" CELOTEX
SET INTO BOW PLATE
SCREW OR BOLT TO CLEAT
BOW PLATE
PINE RISER
NOTCH FOR STRINGERS
WHEEL BOX-TOP, SIDE PANEL AND SLANTING BACK OF 1/4" PLYWOOD
1/4" BULKHEAD
1" X 2" SHELF FRAMING
CLEAT
OAK FILLER - CUT IN CENTER FOR TONGUE
WELD
7"
2" X 2"
1" X 2"
SEE DETAIL 'A' FOR MORTISED JOINT
13½"
3/4" X 6" SECOND GRADE T. & G. PINE FLOORING
SEE DETAILS 'BB' FOR METHOD OF MORTISING JOINT
SHIM HERE
CUT AND FLATTEN TIE ROD-BOLT FLATTENED END TO AXLE
KNEE
1 1/4" X 1 1/4" X 3/16" ANGLE IRON
FLATTEN ENDS OF RADIUS RODS — BOLT HERE
CARLIN
20" X 4" WHEELS FIT FORD MODEL "T" SPINDLES WITHOUT ALTERATIONS

GENERAL PERSPECTIVE CONSTRUCTION DRAWING SHOWING FLOORING AND OTHER FRAMING DETAIL

This important construction drawing is not in scale but is arranged to show the general detail of the chassis, the flooring and—above—the principal stanchion joints. Note how the frame is "kicked up" in order to undersling the trailer. Note also the framing about the wheel boxes and the installation of the bulkheads and the bow plate. Study with the photo at right.



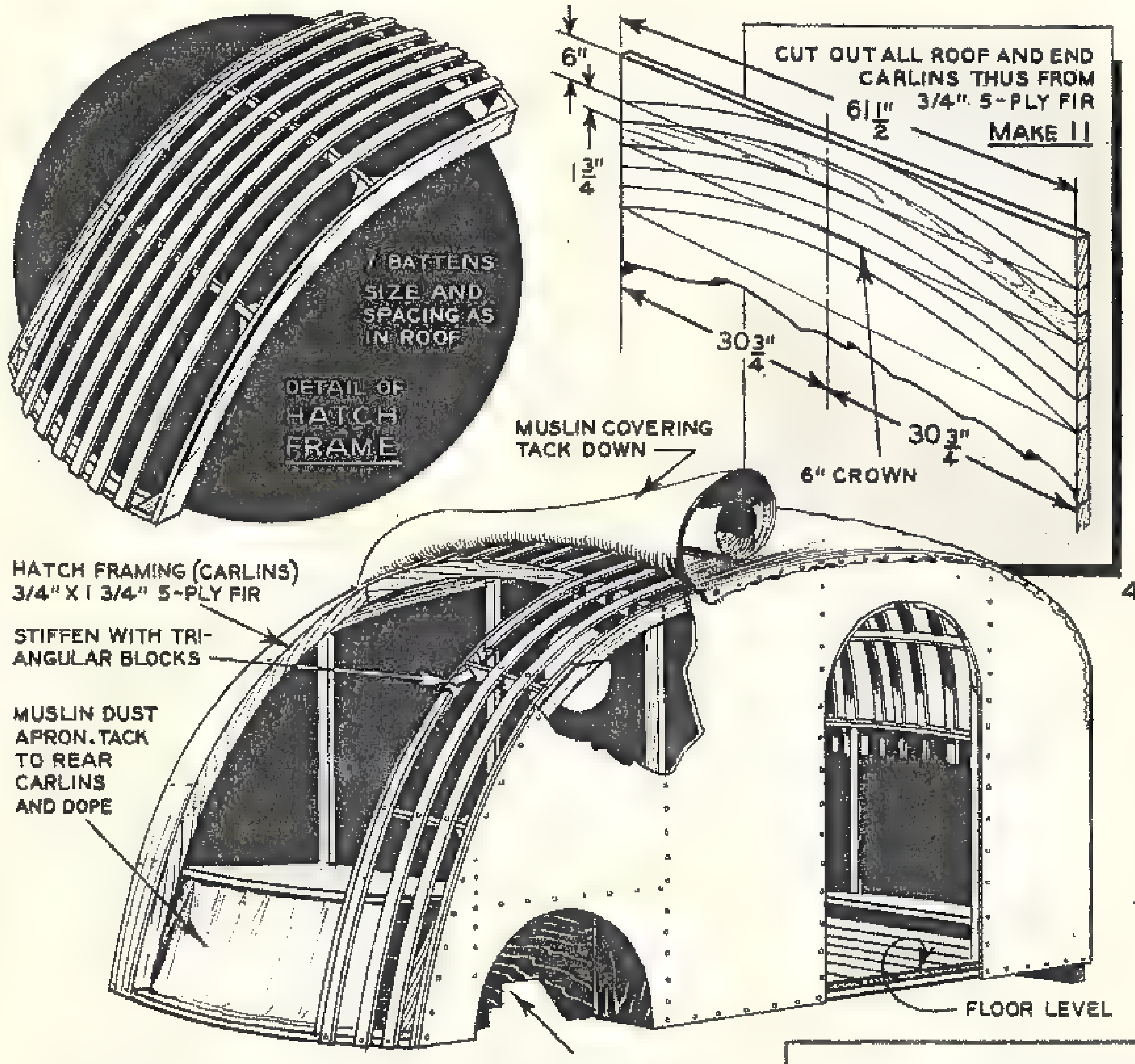
Immediately aft of this compartment the sink and stove shelf is located. This shelf is made readily detachable so that the axle may be inspected if necessary or to permit the easy placing of a jack under the axle in case of flat tires.

The shelf rests on a light framing of 1"x2" pine as shown in the drawings. It can be held in place by a few light screws or by four wing nuts. The stove is secured to it in the manner shown and a simple sink can be made from a large cake pan and set into the shelf with small screws.

A muslin apron, tacked from shelf carlin to rear carlin and from wheel box inner panels, serves to keep the dust out. This apron should be doped.

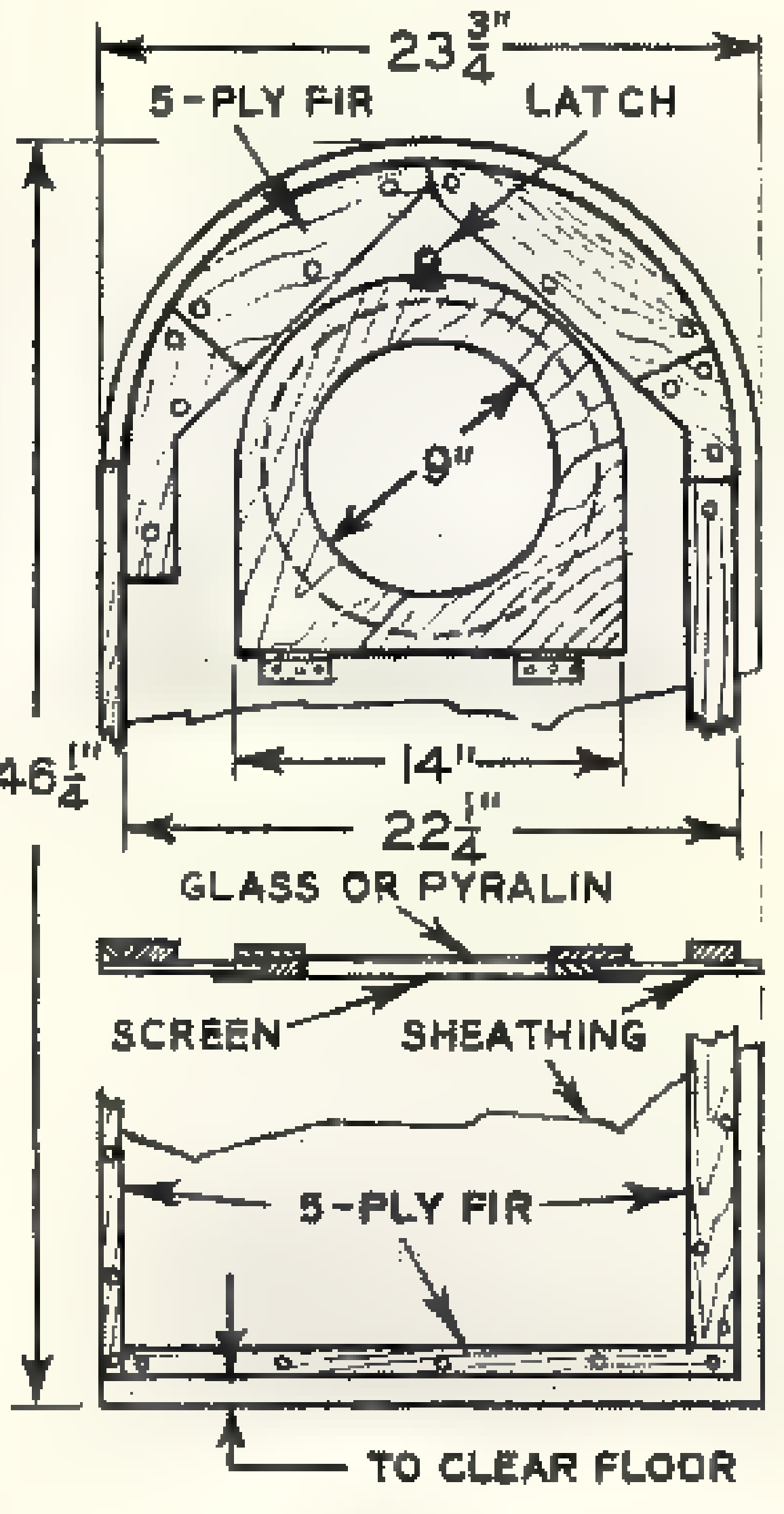
The tank for water may be any size and the details of its installation will naturally depend upon the size used. In any case it should be so arranged as to empty directly into the sink. Cupboards and shelves may be any way you prefer. A

Here is an exceptionally clear picture of the simple door. It may be varied but it is hard to improve for simplicity and sturdy construction. Note the blind door handle box—not shown in the drawings below.


7 BATTENS SIZE AND SPACING AS IN ROOF
DETAIL OF HATCH FRAME
6"
1¾"
CUT OUT ALL ROOF AND END CARLINS THUS FROM 3/4" 5-PLY FIR
61½"
MAKE 11
30¾"
30¾"
6" CROWN
MUSLIN COVERING TACK DOWN
HATCH FRAMING (CARLINS) 3/4" X 1 3/4" 5-PLY FIR
STIFFEN WITH TRIANGULAR BLOCKS
MUSLIN DUST APRON. TACK TO REAR CARLINS AND DOPE
FLOOR LEVEL

BODY DETAILS - NOTE-FASTEN BATTENS AND SHEATHING BY MEANS OF LIGHT BRASS OR COPPER SCREWS

CUT OUT INSIDE PANELS OF WHEEL BOXES TO PROVIDE CLEARANCE WHERE THE AXLE PASSES THRU.


23¾"
5-PLY FIR
LATCH
9"
46¼"
14"
22¼"
GLASS OR PYRALIN
SCREEN
SHEATHING
5-PLY FIR
TO CLEAR FLOOR

DETAIL OF DOOR SHOWING HINGED GLASS WINDOW CLOSED

The roof carlins or beams are cut in the manner shown above. Galley hatch side carlins are cut to normal profile body lines.

RUNLITE BLUEPRINTS
Large blueprint plans for building "Runlite" printed on tough rag content paper are available from Modern Mechanix Publ. Co., 1501 Broadway, New York City. Order Blueprint No. T-29 at $2.00

Completing "Midget Mike"

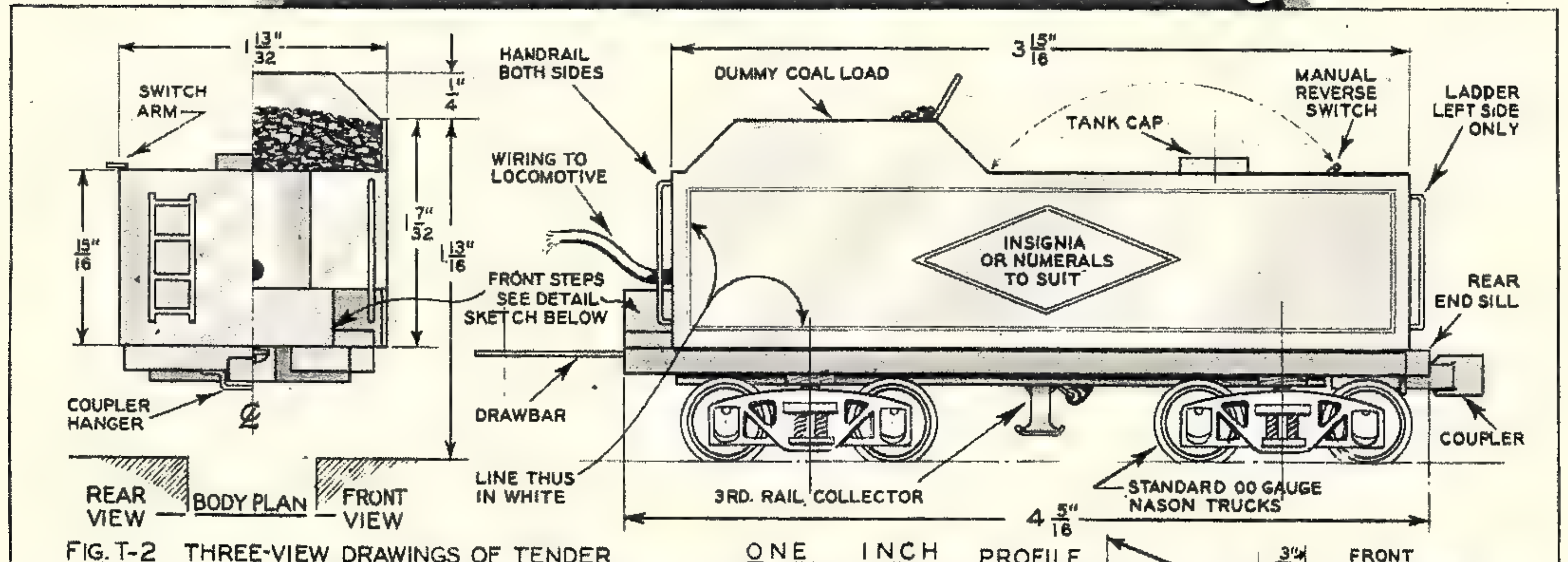
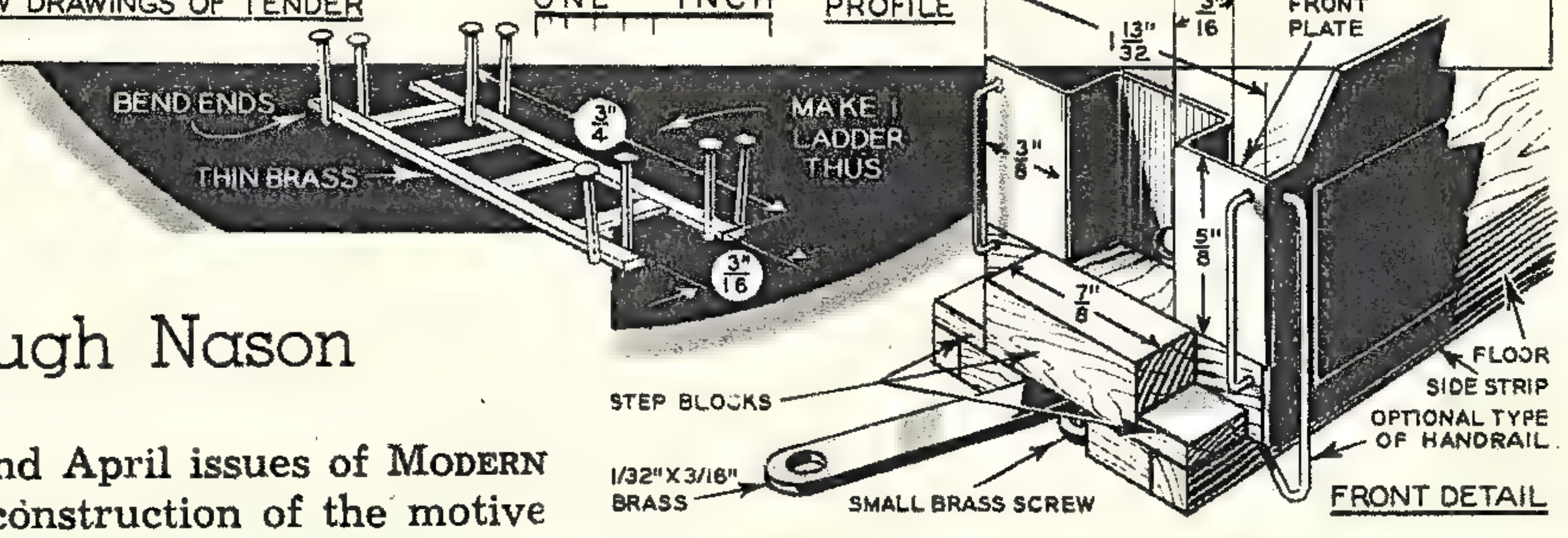

SWITCH ARM
1 13/32"
1/4"
15/16"
1 7/32"
1 13/16"
COUPLER HANGER
REAR VIEW
BODY PLAN
FRONT VIEW
HANDRAIL BOTH SIDES
WIRING TO LOCOMOTIVE
FRONT STEPS SEE DETAIL SKETCH BELOW
DRAWBAR
LINE THUS IN WHITE
DUMMY COAL LOAD
3 15/16"
TANK CAP
MANUAL REVERSE SWITCH
LADDER LEFT SIDE ONLY
INSIGNIA OR NUMERALS TO SUIT
REAR END SILL
COUPLER
3RD. RAIL COLLECTOR
STANDARD 00 GAUGE NASON TRUCKS
4 5/16"
ONE INCH
PROFILE

FIG. T-2 THREE-VIEW DRAWINGS OF TENDER

Dimensions for constructing "Midget Mike's" tender are given in the above profile body plans.


BEND ENDS
THIN BRASS
3/4"
3/16"
MAKE 1 LADDER THUS
1 13/32"
3/16"
FRONT PLATE
3/8"
5/8"
7/8"
STEP BLOCKS
1/32"X3/16" BRASS
SMALL BRASS SCREW
FLOOR
SIDE STRIP
OPTIONAL TYPE OF HANDRAIL
FRONT DETAIL

The tender is formed from either sheet tin or brass and mounted on a wooden chassis to which "bought" trucks are attached. Front details are shown here.

by Hugh Nason

IN THE March and April issues of MODERN MECHANIX the construction of the motive power unit of "Midget Mike" was described. This tiny 00 gauge locomotive possessed several unique features, the most important one being that it could be constructed from ordinary materials obtainable anywhere. Brass tubing, channel and a few pieces of tin in the hands of a careful craftsman resulted in a powerful locomotive having ample traction to pull loads exceeding fifteen pounds. In this, the final installment, we take up the construction of the tender; the reverse mechanism and the wiring detail.

The tender is built of wood, brass sheet and odd ends of brass or tin. The floor of the tender is a piece of pine 1⅜″ wide, 5/16″ thick and 3⅞″ long. The sides and rear end are formed from one piece of 26 ga. brass. The whole assembly is graphically shown in Fig. T-1. In fact the accompanying drawings are unusually detailed and clear so that a careful study of them provides adequate instruction for building the tender. However, a few brief notes are added for the further convenience of the builder.

Make a template of the two sides and the back end first. Take the dimensions off the plans in Fig. T-2 and do not forget to allow for the bend when laying out the template. Scribe the bend lines with *pencil* to avoid cracking the brass sheet when bending later. Do not use a hammer to form the bend, a mallet is better, and use care to have the job square.

Fasten the metal body to the wood floor in the manner shown, filing off the heads of the ½″ brass woodscrews clear to the shank after first flowing solder around each screw head so that it reaches the shank.

The chassis or underframe is built up as shown. The actual construction of the front steps and front sill may be varied as the builder desires as long as the appearance shown is retained. The rear end sill is cut out as shown in the details given in Fig. T-3 and Fig. T-1. The length of the drawbar may vary slightly to suit the radius of the curves on the track used. Bend the front plate to shape as shown and solder in place. The coal compartment back piece is also soldered in but at a slant as shown. The cover of the water tank may be cigar box wood or any ⅛″ material. The support posts should be just high enough to bring the cover exactly level with the tender sides when it is placed in position. Allow a slight gap on one side to accommodate the reverse switch lever. The tank filler cap serves as a convenient handle to remove the cover when it is desired to get at the reversing unit.

Standard Nason 00 gauge trucks are specified. Small brass screws are used to pivot the trucks to the center sill where the cross-bolsters occur. In making the dummy coal load be sure to leave space beneath it for the several wires which run from tender to locomotive. A hole is likewise drilled in the front plate for the wires to pass through.

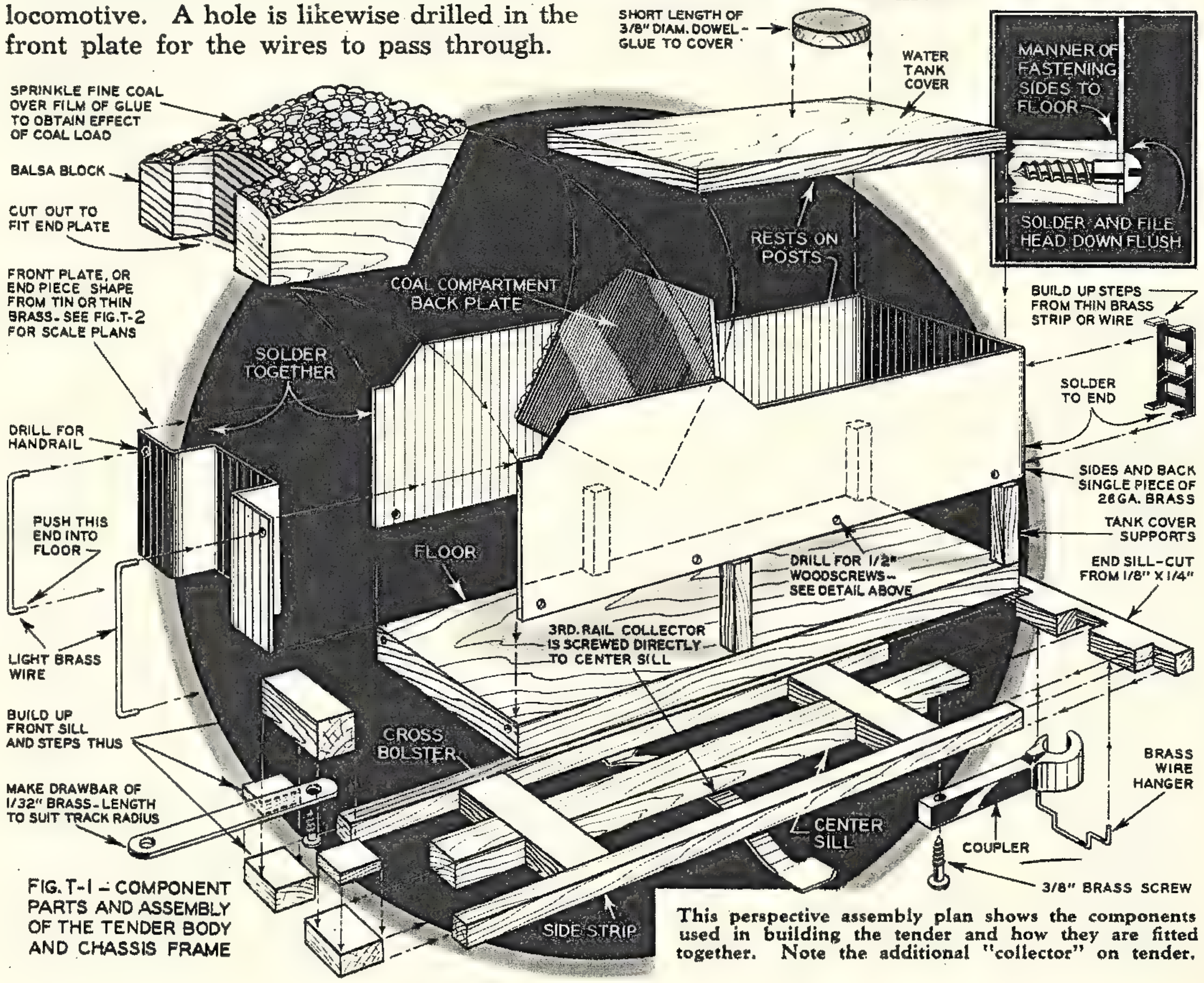

SHORT LENGTH OF 3/8" DIAM. DOWEL - GLUE TO COVER
WATER TANK COVER
MANNER OF FASTENING SIDES TO FLOOR
SOLDER AND FILE HEAD DOWN FLUSH
SPRINKLE FINE COAL OVER FILM OF GLUE TO OBTAIN EFFECT OF COAL LOAD
BALSA BLOCK
CUT OUT TO FIT END PLATE
RESTS ON POSTS
COAL COMPARTMENT BACK PLATE
FRONT PLATE, OR END PIECE SHAPE FROM TIN OR THIN BRASS - SEE FIG. T-2 FOR SCALE PLANS
SOLDER TOGETHER
BUILD UP STEPS FROM THIN BRASS STRIP OR WIRE
SOLDER TO END
DRILL FOR HANDRAIL
SIDES AND BACK SINGLE PIECE OF 26 GA. BRASS
TANK COVER SUPPORTS
PUSH THIS END INTO FLOOR
FLOOR
DRILL FOR 1/2" WOODSCREWS - SEE DETAIL ABOVE
END SILL - CUT FROM 1/8" X 1/4"
LIGHT BRASS WIRE
3RD. RAIL COLLECTOR IS SCREWED DIRECTLY TO CENTER SILL
BUILD UP FRONT SILL AND STEPS THUS
CROSS BOLSTER
BRASS WIRE HANGER
MAKE DRAWBAR OF 1/32" BRASS - LENGTH TO SUIT TRACK RADIUS
CENTER SILL
COUPLER
3/8" BRASS SCREW
SIDE STRIP

FIG. T-1 – COMPONENT PARTS AND ASSEMBLY OF THE TENDER BODY AND CHASSIS FRAME

This perspective assembly plan shows the components used in building the tender and how they are fitted together. Note the additional "collector" on tender.

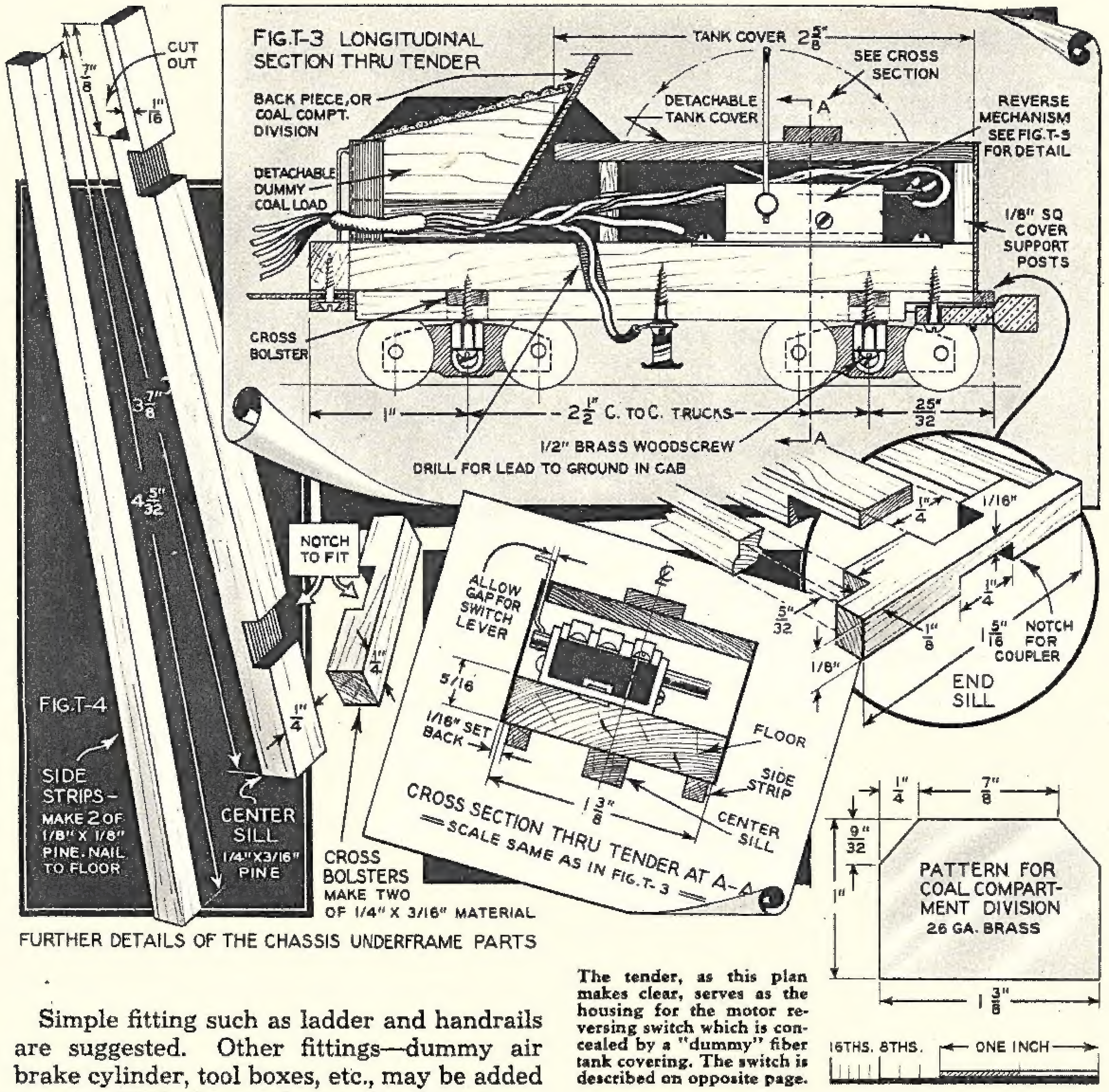


FIG.T-3 LONGITUDINAL SECTION THRU TENDER
TANK COVER 2 5/8"
SEE CROSS SECTION
BACK PIECE, OR COAL COMPT. DIVISION
DETACHABLE TANK COVER
A
REVERSE MECHANISM SEE FIG.T-5 FOR DETAIL
DETACHABLE DUMMY COAL LOAD
1/8" SQ COVER SUPPORT POSTS
CROSS BOLSTER
1"
2 1/2" C. TO C. TRUCKS
25/32"
1/2" BRASS WOODSCREW
DRILL FOR LEAD TO GROUND IN CAB
CUT OUT
7/8"
1/16"
3 7/8"
4 5/32"
NOTCH TO FIT
1/4"
1/4"
FIG.T-4
SIDE STRIPS - MAKE 2 OF 1/8" X 1/8" PINE. NAIL TO FLOOR
CENTER SILL 1/4" X 3/16" PINE
CROSS BOLSTERS MAKE TWO OF 1/4" X 3/16" MATERIAL
ALLOW GAP FOR SWITCH LEVER
℄
5/32"
5/16
1/16" SET BACK
1/8"
FLOOR
SIDE STRIP
CENTER SILL
1 3/8"
CROSS SECTION THRU TENDER AT A-A
SCALE SAME AS IN FIG. T-3
1/4"
1/16"
1/4"
1/8"
5/16" NOTCH FOR COUPLER
END SILL
1/4"
7/8"
9/32"
1"
PATTERN FOR COAL COMPARTMENT DIVISION 26 GA. BRASS
1 3/8"
16THS. 8THS.
ONE INCH

FURTHER DETAILS OF THE CHASSIS UNDERFRAME PARTS

The tender, as this plan makes clear, serves as the housing for the motor reversing switch which is concealed by a "dummy" fiber tank covering. The switch is described on opposite page.

Simple fitting such as ladder and handrails are suggested. Other fittings—dummy air brake cylinder, tool boxes, etc., may be added to suit. With this work completed the locomotive is ready for painting.

To prepare the model for painting, remove the motor and wash the parts with hot water to which "Oakite" has been dissolved. This solution will take off all grease which has gathered on the model. Then rinse in vinegar and put in a warm place to dry. Be careful not to handle the model or the paint will not adhere to the grease from your fingers. To hold the model while painting, wrap the part you are holding with a soft cloth. Now using a good quality flat black enamel, paint the entire engine and tender black except the tires on the drivers, the top of the tender, drive rods, cross head guides, piston rods and valve rods. These parts are painted with aluminum paint.

The reverse unit is located in the tender of "Midget Mike." This device, which is easily constructed, is designed for manual reversing of the engine as shown in Fig. 5. The base is a piece of 3/4" brass channel 1" long to which one spring brass contact is riveted as shown on the end view. The fiber block which is used as a base for the other three contacts is a piece of standard 1/2" by 1/4" fiber cut to a length of $\frac{11}{16}$". Cut a groove in the bottom to clear the bottom contact. Drill a No. 43 hole in each side of the channel as shown in the side view. Push the fiber block in place and drill No. 50 and tap 2-56 to match the two holes already drilled. Fasten the block in place with brass 2-56 screws. Now drill three No. 50 holes for the upper contacts and tap 2-56.

To make the rotor cut a piece of $\frac{9}{32}$" diameter thin wall brass tube to a length of $\frac{9}{16}$". Cut out as shown in the detail of the rotor, but do not separate the two parts until a 5/8" length of 1/4" diameter fiber tube with an 1/8" hole has been driven into the brass tube and projects slightly at both ends. Then cut as shown on the plans with a fine hacksaw or jeweler's saw. Note they are cut at opposite ends. Drill a No. 28 hole in each side of the channel as indicated, then insert the 1/8" rod in one side, drive through the rotor and then through the other side of the channel until it projects about 1/8". The other three contacts are now cut of spring brass and are a little more than 1/8" wide. Drill a No. 44 hole in each as indicated and fasten to the fiber block with 1/8" long 2-56 brass machine screws. A No. 60 hole is drilled in the rotor shaft to take the reversing handle, which is a piece of brass wire soldered in place. Wire the reverse unit according to the diagram given.

Solder a strip of brass on the bottom so that it can be screwed to the floor of the tender with brass wood screws. The reverse arm projects up through the slot between the tender side and tank cover. So that the reversing switch can be grasped easily, bend the end of the arm outward so as to form an "L" shaped handle. The proper location of this unit is shown in the cross section drawings of Fig. T-3.

An additional collector is mounted underneath the chassis of the tender and is identical in construction to the one used on the locomotive, itself, and described in a previous installment. Wire up the reversing unit to the motor carefully, otherwise your motor will not run in either direction. If difficulty is experienced in connecting the reverse switch, some experimenting will soon reveal the correct hookup required.

"Midget Mike" is now complete and ready for hauling its first train. If you are a new convert to this hobby it will, of course, be necessary for you to construct your track layout. Tracks are laid in much the same manner as the conventional railroad rails using brass track and miniature ties. These materials are available from any model railway supply house.

A test run with "Midget Mike" will start you on a hobby with endless thrills and one that offers the craftsman with little or much money the maximum from his investment.

"MIDGET MIKE" BLUEPRINT PLANS

Complete plans for building "Midget Mike" in actual scale size are available in blueprint form at $3.00 per set. The plans are printed on genuine tough rag content blueprint paper to withstand rough workshop usage. Order blueprint No. M-408 from:
Modern Mechanix Publ. Co., Greenwich, Conn.

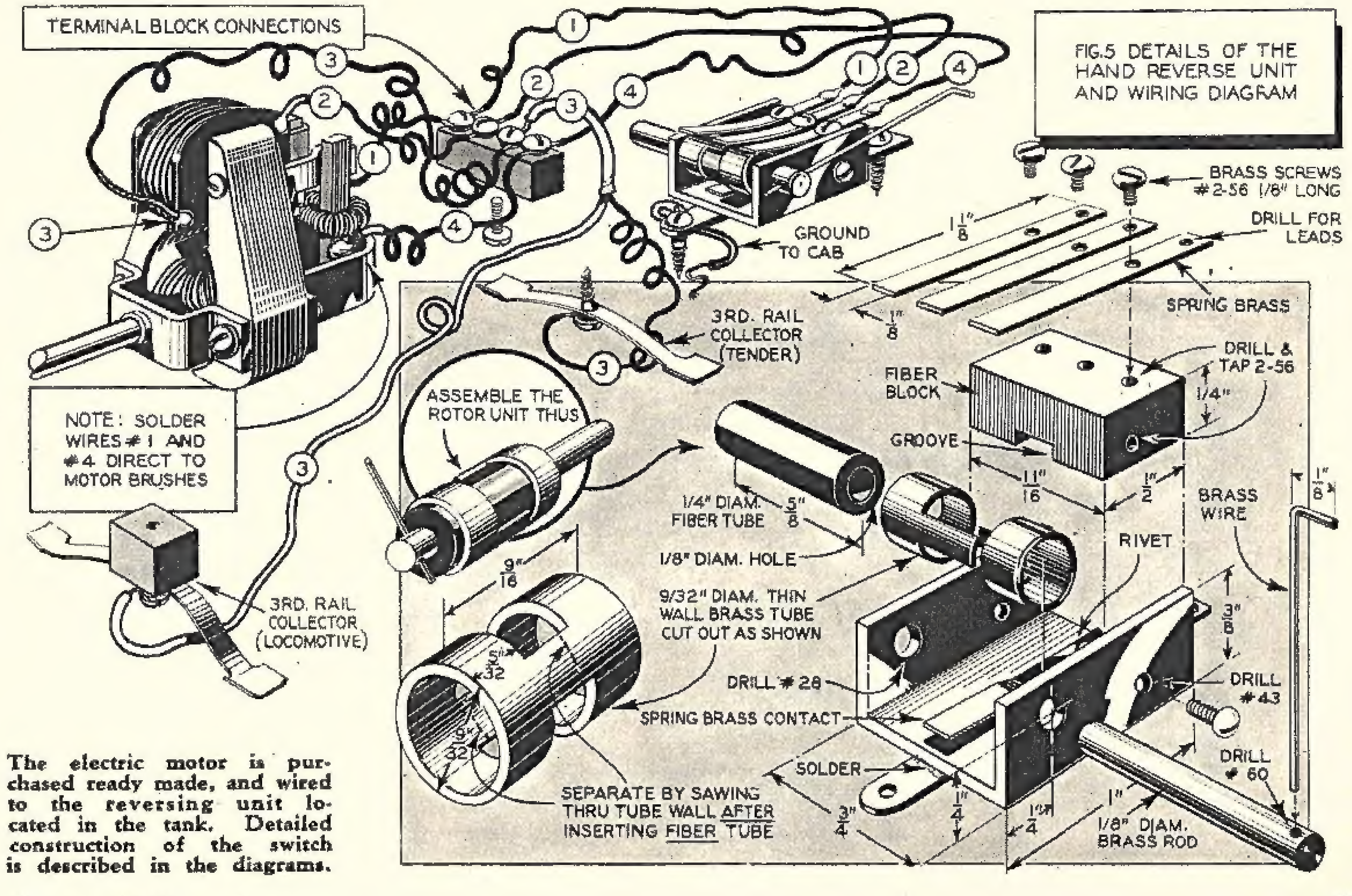
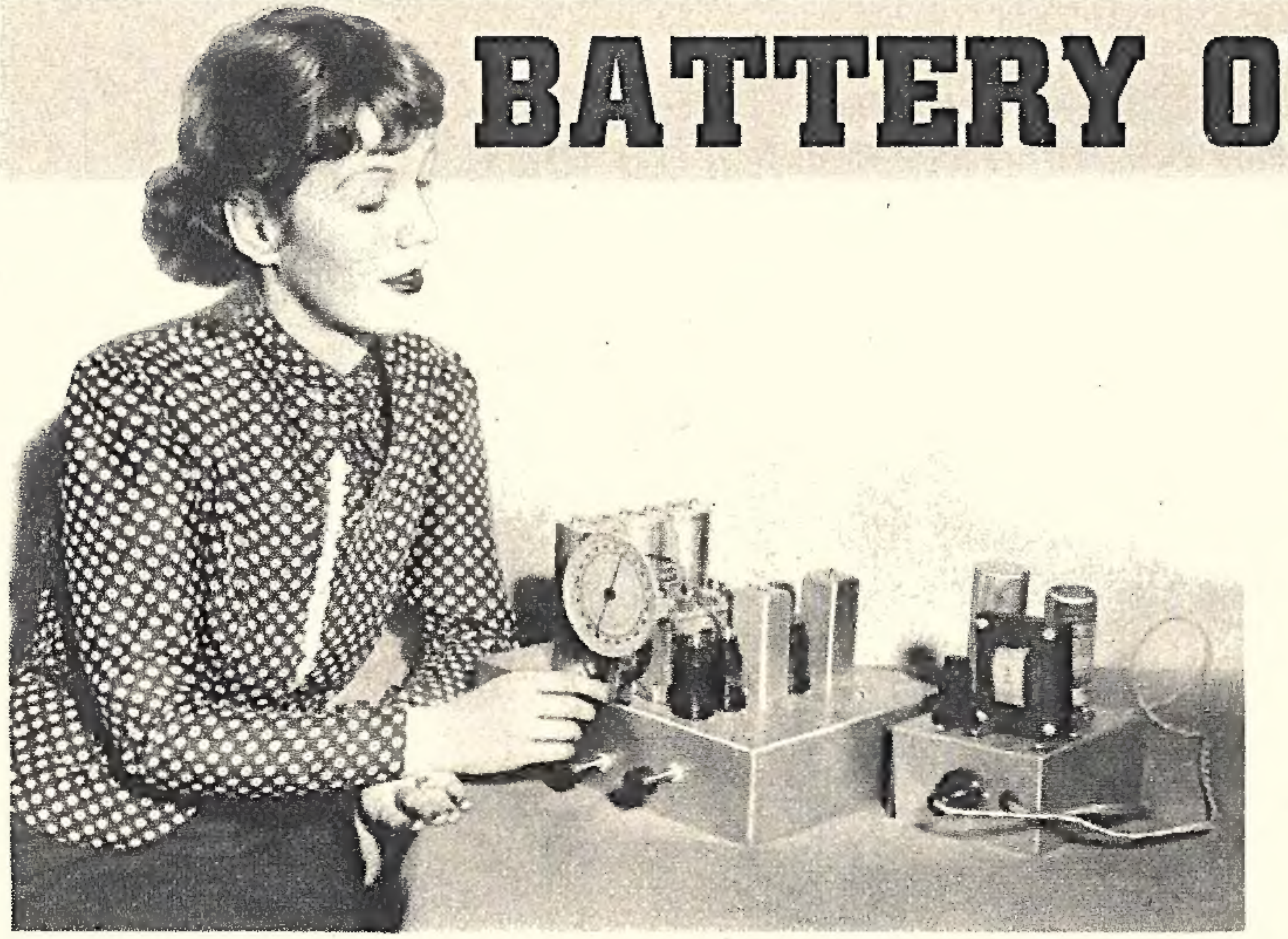

TERMINAL BLOCK CONNECTIONS
①
②
③
④
GROUND TO CAB
BRASS SCREWS #2-56 1/8" LONG
DRILL FOR LEADS
1 1/8"
1/8"
SPRING BRASS
3RD. RAIL COLLECTOR (TENDER)
NOTE: SOLDER WIRES #1 AND #4 DIRECT TO MOTOR BRUSHES
ASSEMBLE THE ROTOR UNIT THUS
FIBER BLOCK
DRILL & TAP 2-56
1/4"
GROOVE
11/16"
1/2"
BRASS WIRE
1/8"
1/4" DIAM. FIBER TUBE 5/8"
1/8" DIAM. HOLE
RIVET
9/16"
9/32" DIAM. THIN WALL BRASS TUBE CUT OUT AS SHOWN
3/8"
3RD. RAIL COLLECTOR (LOCOMOTIVE)
5/32"
DRILL #28
DRILL #43
SPRING BRASS CONTACT
9/32"
SOLDER
DRILL #60
SEPARATE BY SAWING THRU TUBE WALL AFTER INSERTING FIBER TUBE
3/4"
1/4"
1/4"
1"
1/8" DIAM. BRASS ROD

FIG.5 DETAILS OF THE HAND REVERSE UNIT AND WIRING DIAGRAM

The electric motor is purchased ready made, and wired to the reversing unit located in the tank. Detailed construction of the switch is described in the diagrams.

BATTERY OPERATES ALL-WAVE FARM SET

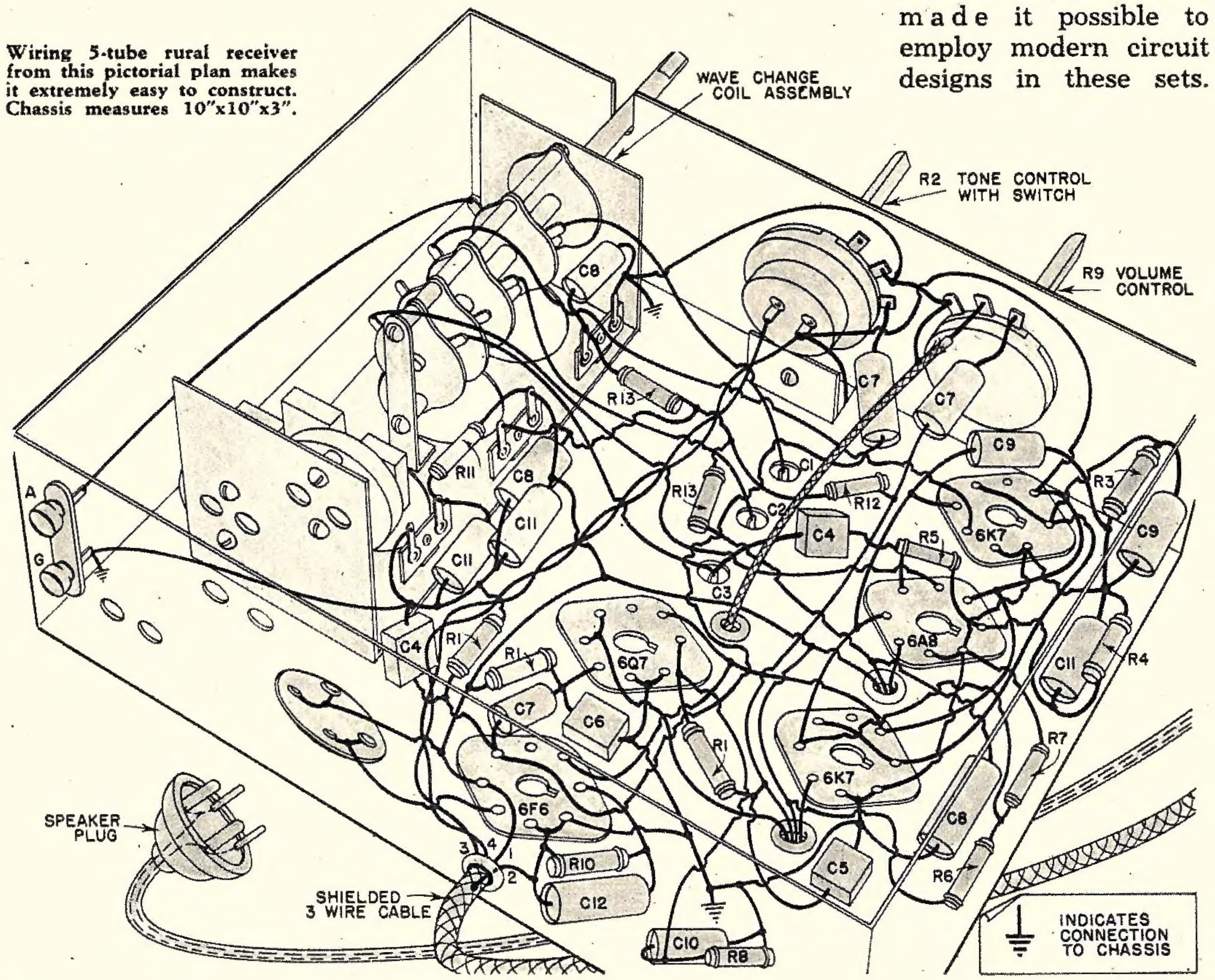


Rural fans no longer need be without a modern metal tube radio. A single battery supplies current.

by H. L. Warner

FOR the rural listener who does not have access to city current nothing is quite as annoying as the constant difficulties experienced with early battery receivers suddenly going dead in the middle of a program. Ancient circuits and faulty tubes, subject to microphonic noises, are responsible for much of the trouble and a new set of batteries every week will do little to improve or insure reception.

With the advent of the vibrator B power supply the farm receiver procured a new lease on life, for the unit made it possible to employ modern circuit designs in these sets.


WAVE CHANGE COIL ASSEMBLY
R2 TONE CONTROL WITH SWITCH
R9 VOLUME CONTROL
C8
R13
C7
C7
C9
R3
C9
A
G
R11
C8
C11
C11
C1
C2
R13
R12
C4
R5
6K7
C3
C4
R1
R1
6Q7
6A8
C11
R4
C7
C6
R1
R7
6K7
6F6
C8
SPEAKER PLUG
3
4
1
2
R10
C12
SHIELDED 3 WIRE CABLE
C5
R6
C10
R8
INDICATES CONNECTION TO CHASSIS

Wiring 5-tube rural receiver from this pictorial plan makes it extremely easy to construct. Chassis measures 10"x10"x3".

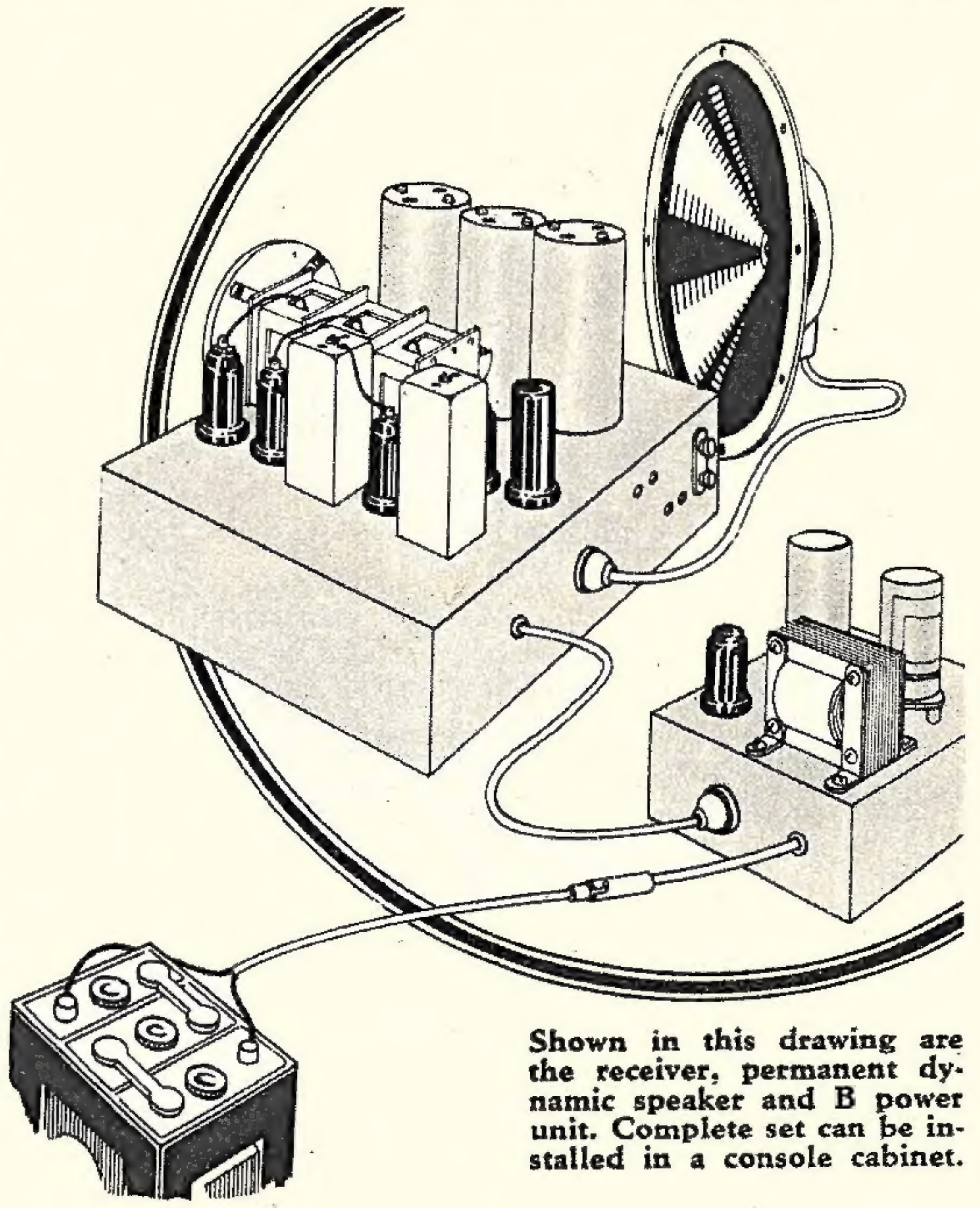
The vibrator device is a unique apparatus that converts 6 or 32-volt direct current into alternating so that it can be increased to any desired voltage by feeding it into a power step-up transformer and rectifying it in the same manner as the current used in electric receivers operating on city current.

In designing this modern all-wave rural receiver only parts which could be obtained at any radio supply house were selected. These were arranged into an ingenious circuit which employs five metal tubes and provides maximum efficiency. A wave switch of simple design permits rapid tuning from long wave to short with ample volume on both European and American broadcasts. In addition to the all-wave tuning this set features a tone control and permanent dynamic speaker, neither of which are found on the obsolete farm set.

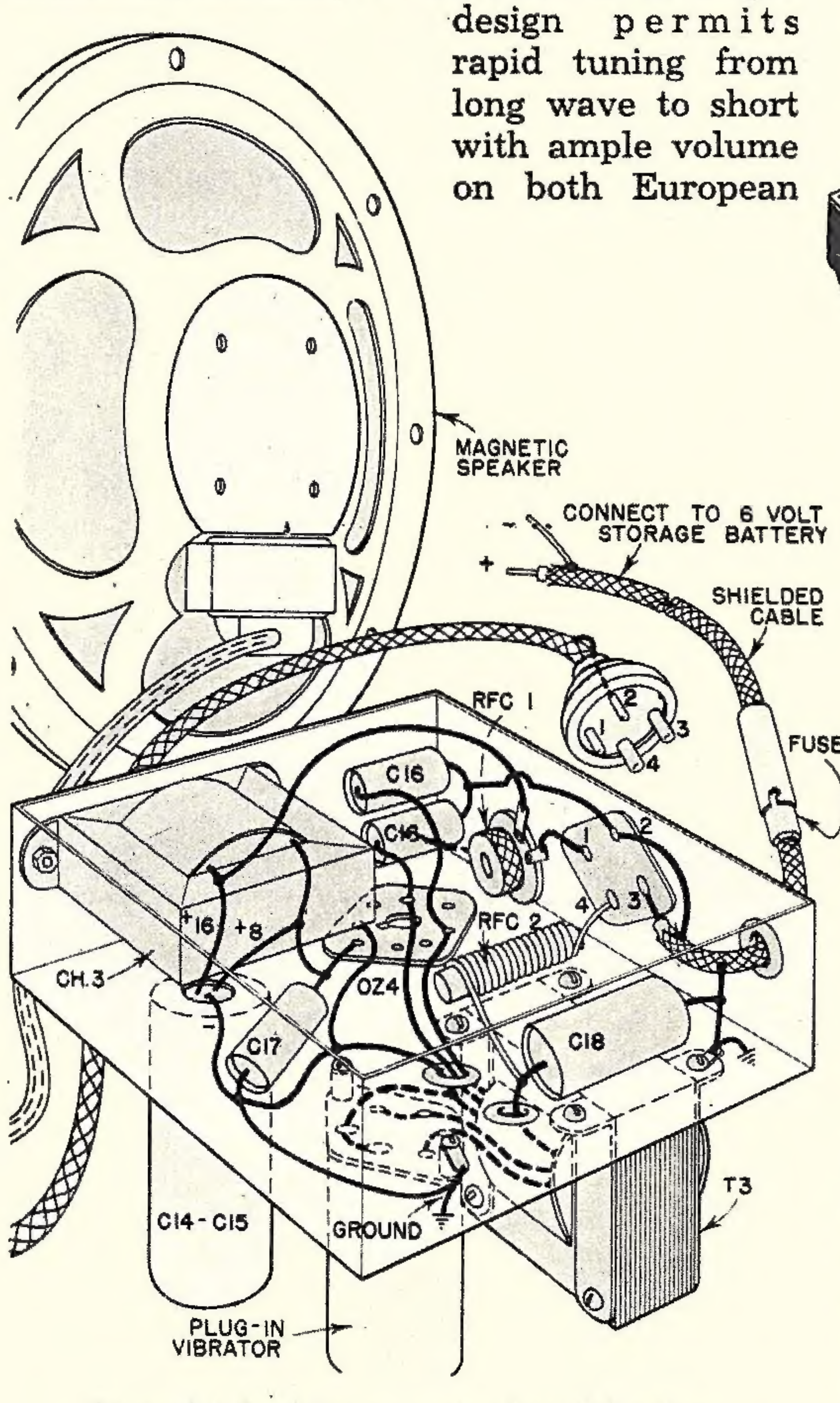
To start actual construction on the set first form the chassis from a sheet of aluminum or electralloy so that when bent to shape it measures 10" by 10" by 3". Before bending the chassis to shape holes for sockets should be cut in the top with a fly cutter using the template diagram as a guide.

With the various holes completed, start assembling the receiver's components in their respective positions inside the chassis. Mount the five octal 8-prong tube sockets first; next the tuning coil assembly, switch inside, coils on top of chassis and last install the 3-gang tuning condenser. All parts are fastened to the chassis with 6/32 brass machine screws and hex nuts to match. Bolt all parts securely so that there is no chance for them to work loose.

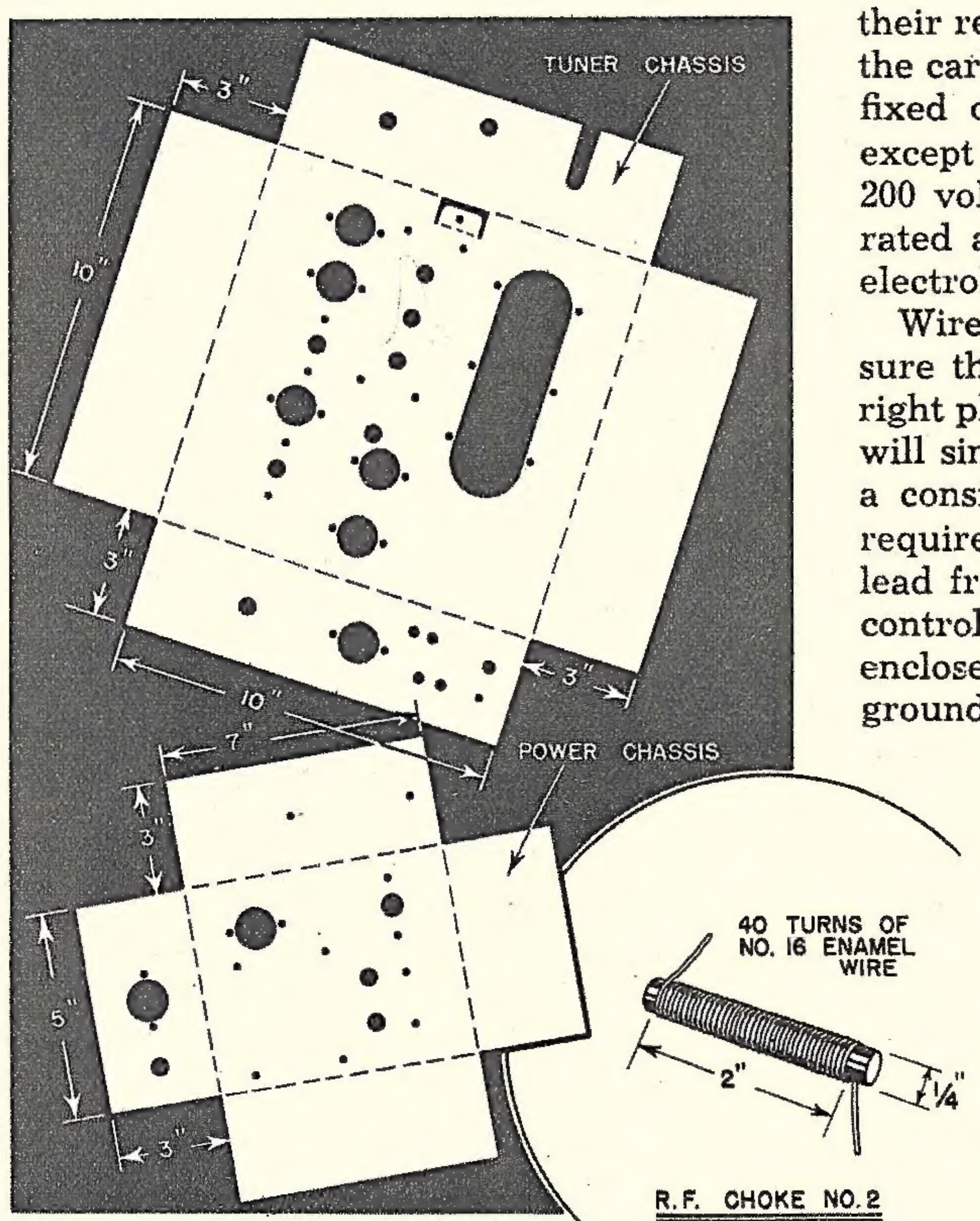
Since all resistors and condensers used in this set are provided with "pigtail" leads a considerable amount of wiring is eliminated by sliding insulating spaghetti tubing over these leads and soldering them directly into



Shown in this drawing are the receiver, permanent dynamic speaker and B power unit. Complete set can be installed in a console cabinet.


MAGNETIC SPEAKER
CONNECT TO 6 VOLT STORAGE BATTERY
-
+
SHIELDED CABLE
RFC 1
1
2
3
4
FUSE
C16
C16
1
2
4
3
+16
+8
RFC 2
CH.3
OZ4
C17
C18
C14-C15
GROUND
T3
PLUG-IN VIBRATOR

Converting 6-volt battery current into high voltage, for operating radio, this B power unit completely eliminates use of B and C batteries formerly used.



Receiver and power unit chassis are cut according to these templates. Wind RFC-2 in power unit as shown.

their respective places. All resistances are of the carbon type and rated at 1 watt. Tubular fixed condensers are all rated at 400 volts except the two .25 mfd. which are rated at 200 volts and the 10 and 25 mfd. which are rated at 35. The latter two condensers are electrolytics.

Wire up the receiver with care making sure that all connections are soldered to the right places. Following the pictorial diagram will simplify the wiring up of the receiver to a considerable extent. Shielded cables are required in several parts of the circuit. The lead from the center terminal of the volume control to the cap of the 6Q7 tube should be enclosed in a shielded covering and the shield grounded to the receiver chassis. Cables connecting the vibrator power supply to the set are also enclosed in a shield which is grounded to the chassis of set and power supply.

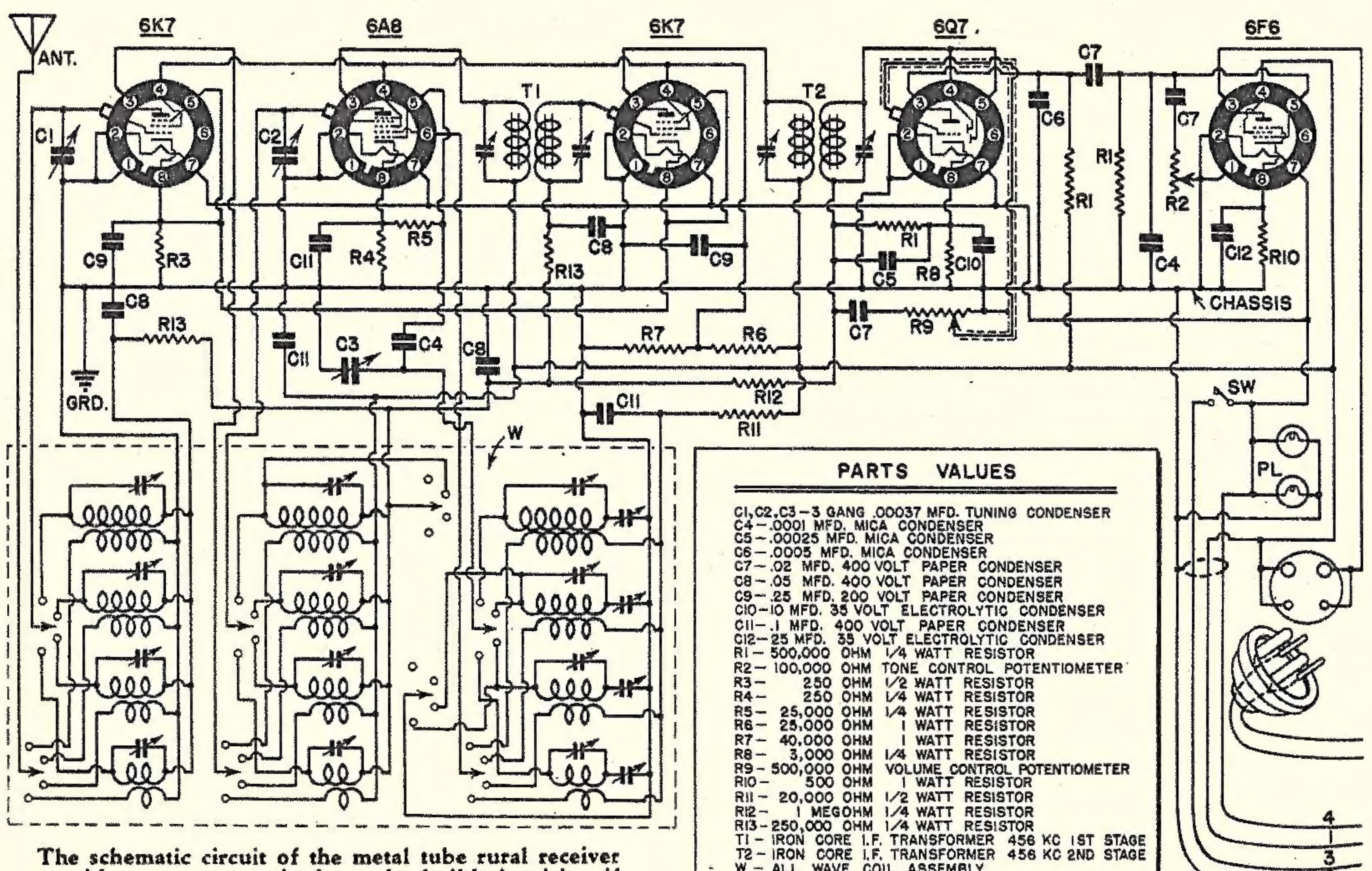
After completing the wiring of the set form the chassis for the B power supply unit and assemble the various parts used in its construction by following the pictorial diagram. Transformer, electrolytic condensers, vibrator and rectifier tube are all standard parts, therefore there will be no difficulty in purchasing them. Three tube sockets are mounted on the rectifier chassis for connecting the receiver cable, rectifier tube and vibrator unit.

Mount these parts with machine screws in the same manner as the set components installing lock washers under the hex nuts to prevent parts working loose from the vibration of the transformer and vibrator. After wiring the B power supply connect a shielded battery cable, such as used in automobile receivers and fitted with a built-in fuse, to a six-volt storage battery. Connect the receiver cable plug in the side of the power unit and the all-wave receiver is ready for its first test.

Unless your all-wave coil assembly is supplied with a matched gang condenser it will be necessary to have the completed set balanced with an oscillator. If the builder does not own this instrument he can have the work done by a local radio serviceman at a small charge. After the receiver has been balanced correctly it is ready for use. Connect an antenna of not more than 75 feet in length to the antenna post and a good ground connection to the ground post. The tubes will require a few seconds to heat up before reception can be obtained after which either broadcast, police or foreign stations can be tuned in with a single dial control and the snap of a switch. The tone control permits the permanent dynamic speaker to respond to all tone ranges just like any other modern receiver.

Although only five tubes are employed in the circuit of this receiver their modern construction and high efficiency results in more than enough volume for home requirements. In many localities powerful European stations can be tuned-in with the volume of local broadcasters. Interesting police, airplane and amateur broadcasts can be tuned in at any time to provide new thrills in radio reception.

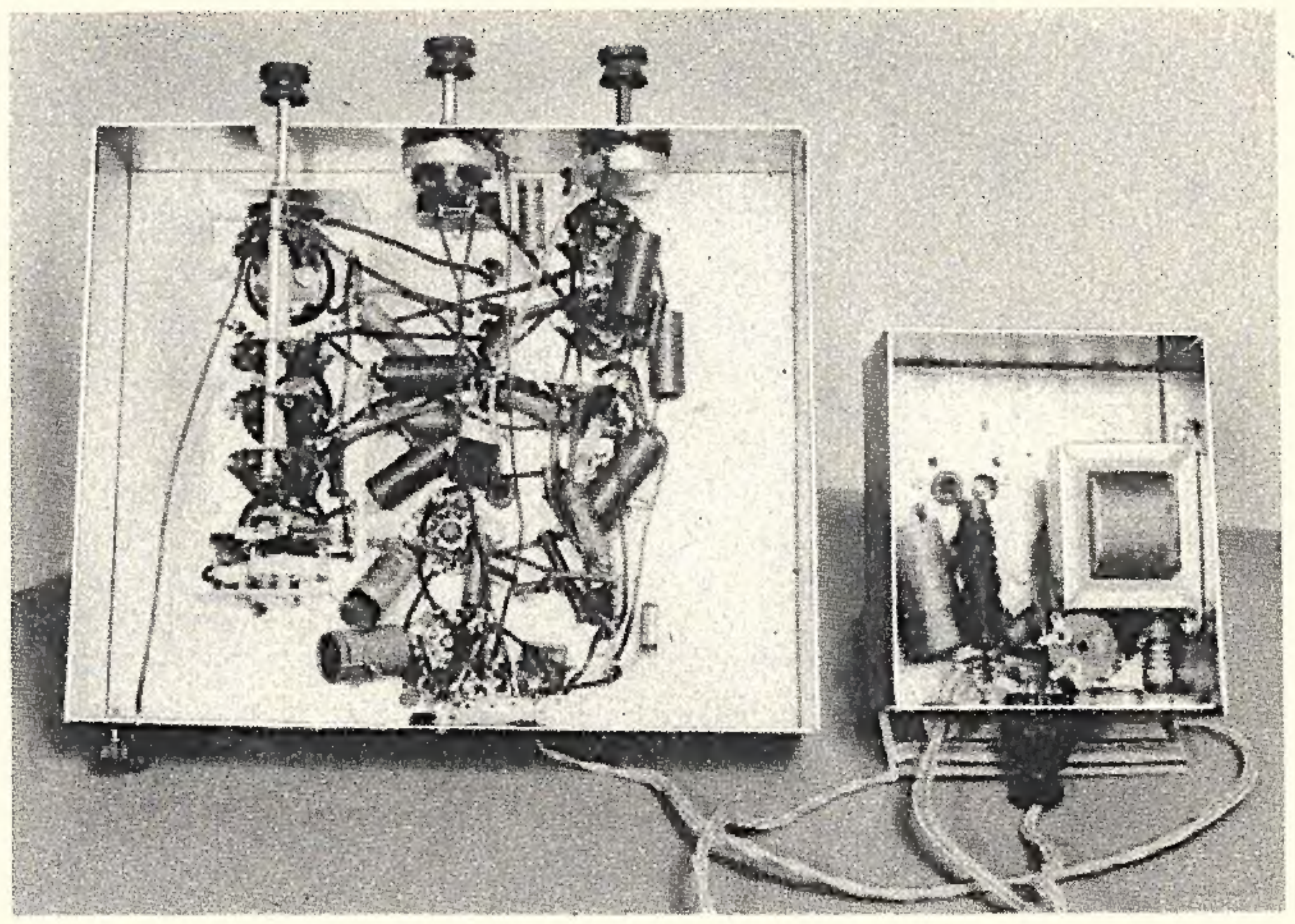
The finished set can be installed in a console cabinet making it an attractive decoration and luxury for any rural home. The set can be operated at no cost by attaching a windcharger to the storage battery. Plans for building an efficient windcharger plant are available from Modern Mechanix Blueprint Dept., Greenwich, Conn., at 50c.



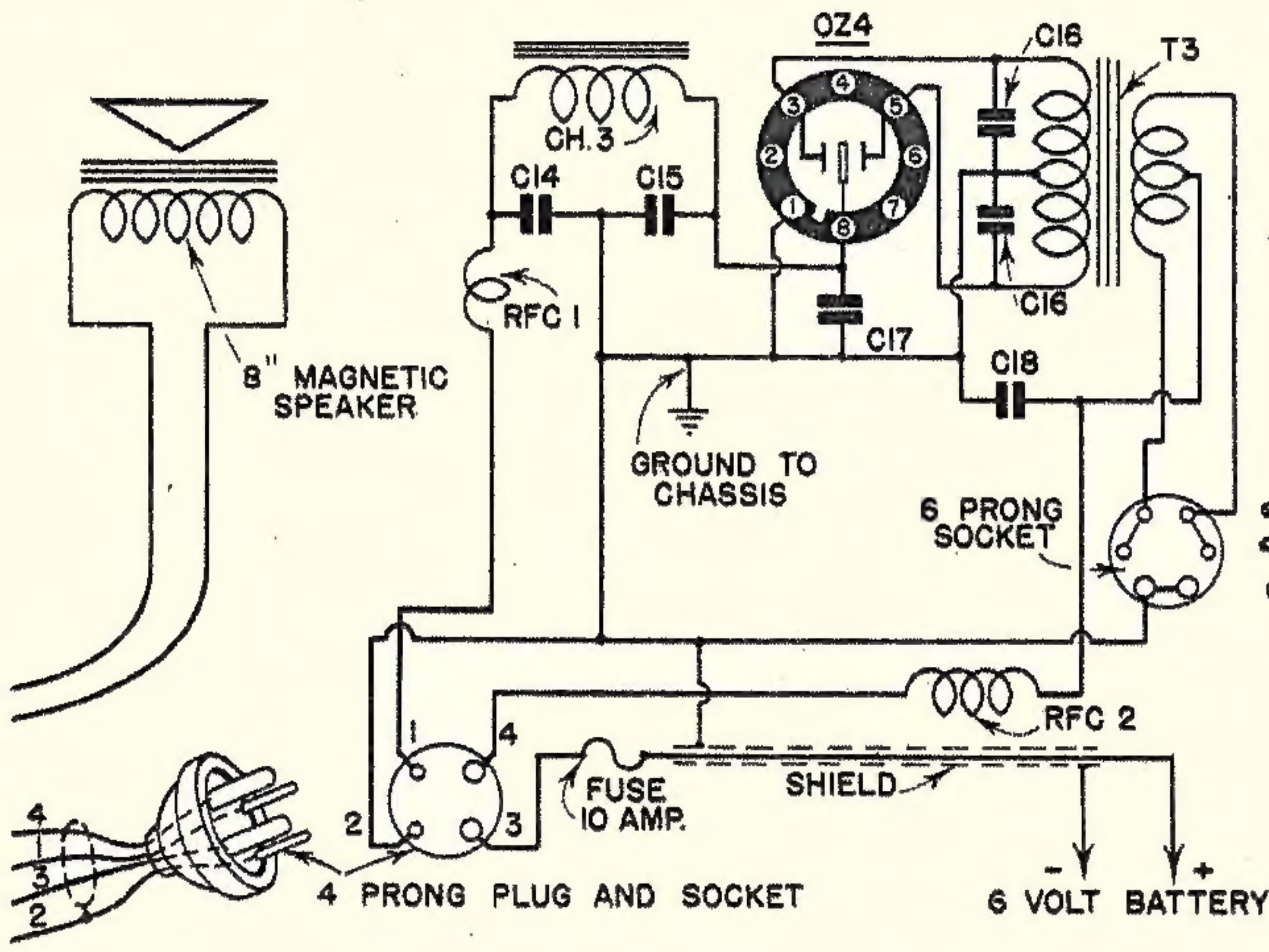
The schematic circuit of the metal tube rural receiver provides an accurate check on the builder's wiring if pictorial plan is followed. Parts are indicated in box.

PARTS VALUES

C1,C2,C3—3 GANG .00037 MFD. TUNING CONDENSER
C4—.0001 MFD. MICA CONDENSER
C5—.00025 MFD. MICA CONDENSER
C6—.0005 MFD. MICA CONDENSER
C7—.02 MFD. 400 VOLT PAPER CONDENSER
C8—.05 MFD. 400 VOLT PAPER CONDENSER
C9—.25 MFD. 200 VOLT PAPER CONDENSER
C10—10 MFD. 35 VOLT ELECTROLYTIC CONDENSER
C11—.1 MFD. 400 VOLT PAPER CONDENSER
C12—25 MFD. 35 VOLT ELECTROLYTIC CONDENSER
R1—500,000 OHM 1/4 WATT RESISTOR
R2—100,000 OHM TONE CONTROL POTENTIOMETER
R3— 250 OHM 1/2 WATT RESISTOR
R4— 250 OHM 1/4 WATT RESISTOR
R5— 25,000 OHM 1/4 WATT RESISTOR
R6— 25,000 OHM 1 WATT RESISTOR
R7— 40,000 OHM 1 WATT RESISTOR
R8— 3,000 OHM 1/4 WATT RESISTOR
R9—500,000 OHM VOLUME CONTROL POTENTIOMETER
R10— 500 OHM 1 WATT RESISTOR
R11— 20,000 OHM 1/2 WATT RESISTOR
R12— 1 MEGOHM 1/4 WATT RESISTOR
R13—250,000 OHM 1/4 WATT RESISTOR
T1—IRON CORE I.F. TRANSFORMER 456 KC 1ST STAGE
T2—IRON CORE I.F. TRANSFORMER 456 KC 2ND STAGE
W—ALL WAVE COIL ASSEMBLY
SW—SWITCH ON TONE CONTROL
PL—PILOT LIGHT 6.3 VOLT



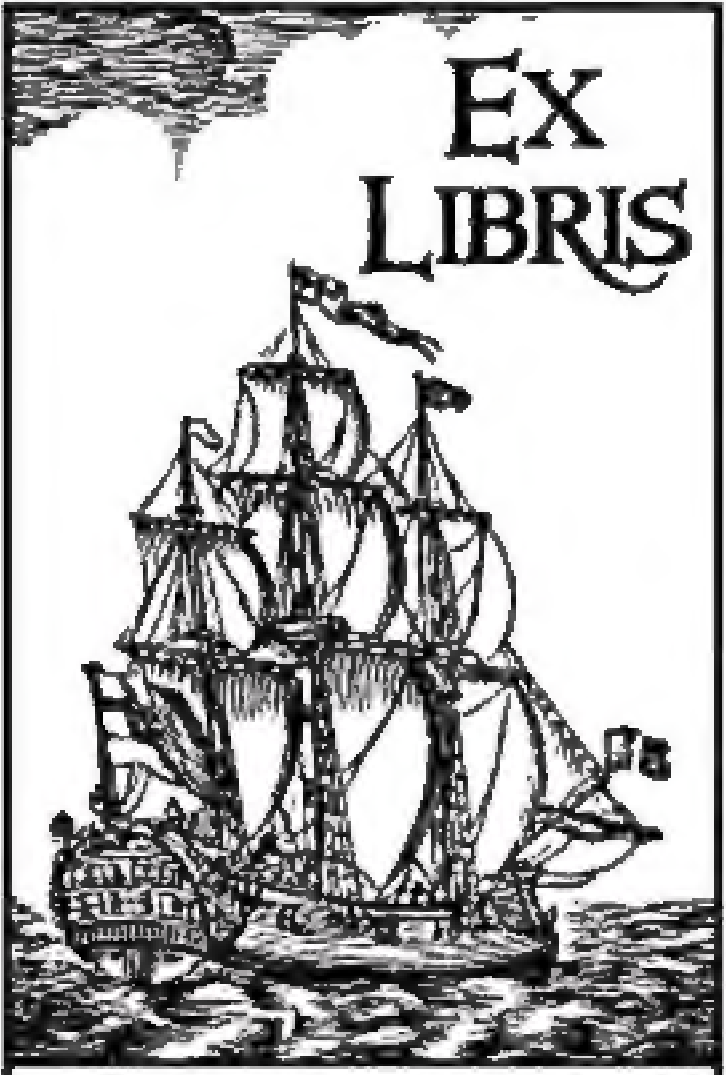
The simplicity of the wiring up of the receiver is indicated in this photograph showing a bottom view of the all-wave receiver and B vibrator power unit.



The schematic circuit of the B power supply is shown here along with a list of materials required. RFC-2 is homemade and consists of 40 turns of No. 16 enameled wire, layer wound, to fill a 1/4" by 2" spool or fiber tube.

PARTS VALUES

C14—16 MFD. 500 VOLT ELECTROLYTIC CONDENSER
C15— 8 MFD. " " " "
C16—.02 MFD. 600 VOLT PAPER CONDENSER
C17—.01 MFD. " " " "
C18—.5 MFD. 400 VOLT " "
RFC 1—30 MH CHOKE
CH.3—30 HENRY FILTER CHOKE
T3—6 VOLT POWER TRANSFORMER



Anon. Malefactor